FURUNO

SERVICE MANUAL

BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM (BNWAS)

MODEL **BR-500**

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Chapter 1 General

The Furuno BR-500 Bridge Navigation Watch Safety System (BNWAS) monitors the watch officer's presence through watch safety system functions. A watch officer is required to press the button on a Timer Reset Panel or to operate navigation equipment (i.e. ECDIS and Radar, etc.) at certain preset intervals. If the officer fails to press the button, operate connected equipment or trigger optional motion sensor within preset intervals, visual and audible alarms will be generated in the wheelhouse. If the officer doesn't respond to the alarm, the BR500 BNWAS transfers the alarm to the Cabin Panels installed in other sections of the vessel in order to inform backup officers of the watch officer's incapacity.

1.1 What is BNWAS?

The purpose of a Bridge Navigational Watch Alarm System (BNWAS) is to monitor bridge activity and detect operator disability which could lead to marine accidents. The system monitors the awareness of the Officer of the Watch (OOW) and automatically alerts the Master or another qualified OOW if for any reason the OOW becomes incapable of performing the OOW's duties. This purpose is achieved by a series of indications and alarms to alert first the OOW and if he is not responding, then to alert the Master or another qualified OOW.
Additionally, the BNWAS provides the Emergency Call function for immediate assistance. The BNWAS should be operational whenever the ship is underway at sea (SOLAS V/19.2.2.3).

Dormant period

The system remains dormant for a period of between 3 and 12 minutes (Td). At the end of this period, the alarm system initiates a visual indication (Prewarning) on the bridge. If the OOW becomes unable to interact with the BNWAS, the system enters a sequence of alarm stages.

First stage bridge audible alarm

If not reset, the BNWAS additionally sound a first stage audible alarm on the bridge 15 seconds after the visual indication is initiated.

Second stage remote audible alarm

If not reset, the BNWAS additionally sound a second stage remote audible alarm in the back-up officer's and/or Master's location 15 seconds after the first stage audible alarm is initiated.

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Third stage remote audible alarm

If not reset, the BNWAS additionally sound a third stage remote audible alarm at the locations of further crew members capable of taking corrective actions 90 seconds after the second stage remote audible alarm is initiated.

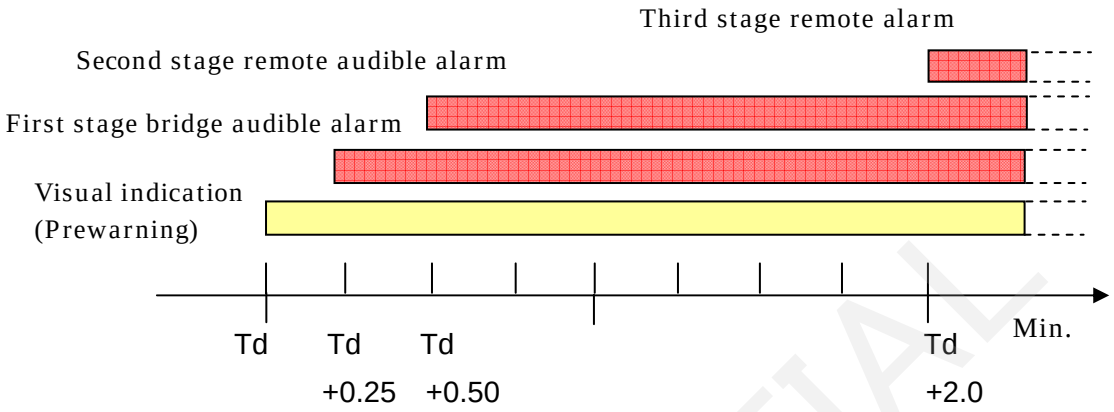

Fig.1.1 Sequence of alarm stages

The second and third stage alarms can be reset only by the reset key on the BR-510 main alarm panel. All audible and visible alarms from the main alarm panel, BR-530 timer reset panel, and BR-540 cabin panel go off when the reset key is pressed.

To initiate the reset function, an input representing a single operator action by the OOW is required. This input is generated by;

1) Pressing the Reset button on the timer reset panel, as well as the main alarm panel,
2) Triggering the motion detector which detects movement of OOW, and
3) Operating the navigational equipment such as ECDIS and radar which provide the Operator Fitness alarm output port.

The timer reset panel is installed on the bridge giving proper look out.

The BNWAS incorporates the following operational modes:

(a) Automatic: Automatically brought into operation whenever the ship's heading or track control system is activated and inhibited when this system is not activated

(b) Manual ON: In operation constantly

(c) Manual OFF: Does not operate under any circumstances

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1.2 IMO Carriage Requirements

The IMO resolution MSC.282(86) adopted June 2009 states that the BNWAS will be a mandatory requirement on vessels of 150 gross tonnage and upwards and passenger ships irrespective of size as follows:

Implementation schedule of Bridge Navigational Watch Alarm System (BNWAS)
2010 07
2011 07
2012 07
2013 07
2014 07
Newly built passenger ships
Newly built cargo vessels
>150 GT
Existing passenger ships
No later than the first survey after July 2012
Existing cargo vessels
>3000 GT
No later than the first survey after July 2012
Existing cargo vessels
over 500 and under 3000 GT
No later than the first survey after July 2013
Existing cargo vessels
over 150 and under 500 GT
No later than the first survey after July 2014
Transitioning period
BNWAS carriage mandatory

Fig.1.2 IMO carriage requirements

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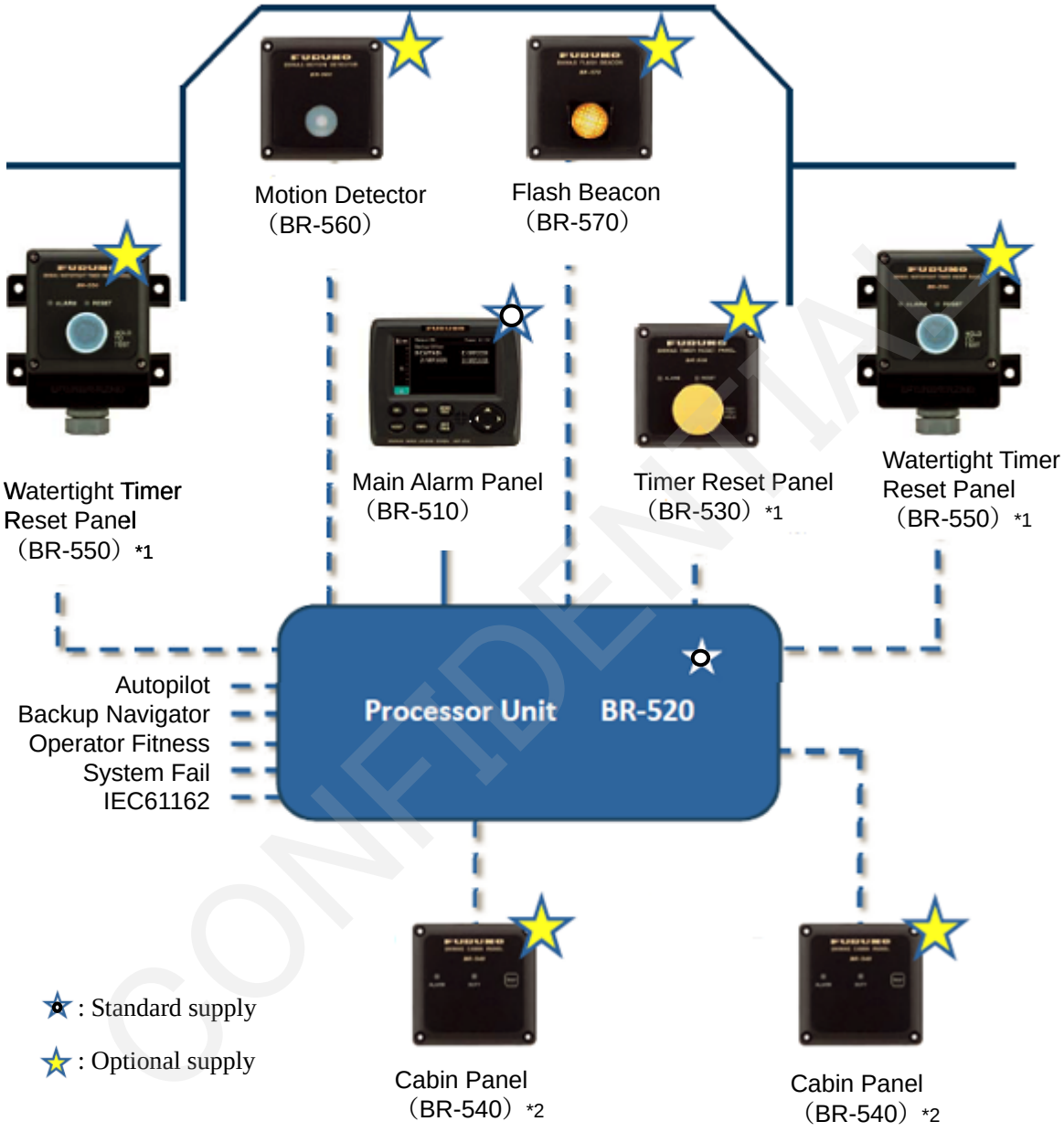
1.3 System Configurations

Fig.1.3 shows the system configurations of BR-500.



*1: A total of six Timer Reset Panels (BR-530/550) can be connected to BR-520.

*2: A total of twelve cabin panels (BR-540) can be connected to BR-520.

Fig.1.3 Configuration of BR-500 BNWAS

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1.4 Maximum Number of Units and Cable Length

Some ports can be used for parallel connections as shown in Table 1.1, considering the maximum of number. Table 1.1 also explains the maximum and total cable length for each unit connected to the processor unit BR-520.

Table 1.1 A maximum of unit to be connected in parallel

Unit Name	Connection to each terminal board	In all	Cable Length
BR-530/550 Timer Reset Panel	A maximum of 2 units	6 units	40 m (Maximum) 150 m (Total)
BR-540 Cabin Panel	A maximum of 3 units	12 units	80 m (Maximum) 300 m (Total)
BR-560 Motion Detector	One unit only	2 units	50 m (Maximum)
BR-570 Flash Beacon	One unit only	3 units	50 m (Maximum)

1.5 Connection of Cabin Panel with 4-core Cable

The cabin panel, BR-540 is connected to the processor unit, BR-520 with a 6-core cable. However, it may be connected with a 4-core cable if lessening function is accepted: the DUTY LED and TEST button are disabled.

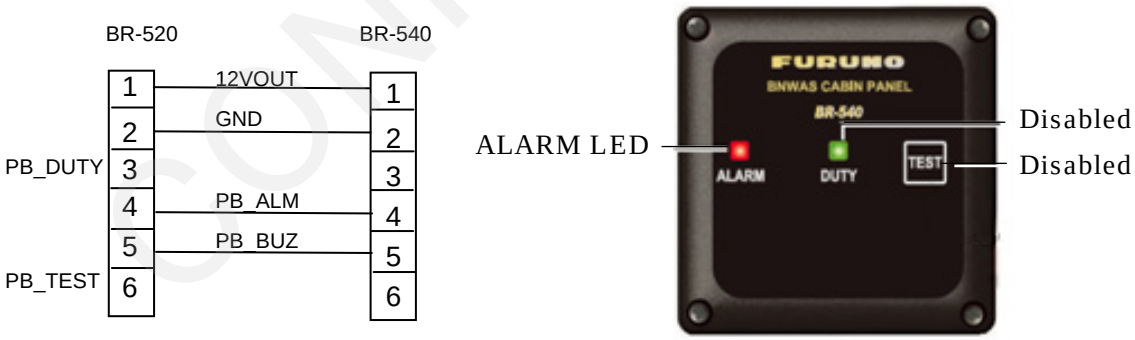

Fig.1.4 Connection of BR-540 with 4-core cable

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Chapter 2 Functional Description

This chapter describes the function of each printed circuit board.

2.1 Printed Circuit Boards

Table 2.1 shows the Printed Circuit Boards (PCBs) used for the BR-500 BNWAS.

Table 2.1 List of PCBs

Unit Name	Name of PCB	Type of PCB
BR-510 Main Alarm Panel	MAIN	20P8200B
	PWR	26P0022A
BR-520 Processor Unit	MAIN	24P0104
	PWR	24P0105
	FIL	24P0110
	PWR Supply	ZWS100BAF-24/FUR
BR-530 Timer Reset Panel	CNT	24P0106
BR-540 Cabin Panel	CNT	24P0106A
BR-550 Watertight Timer Reset Panel	CNT	24P0106
BR-560 Motion Detector	MOT	24P0107
BR-570 Flash Beacon	FLB	24P0108

2.2 Main Alarm Panel (BR-510)

The main alarm panel, BR-510 consists of MAIN board (20P8200B), PWR board (26P0022A), and a 4.3-inch WQVGA color LCD (SD80003T00). The main alarm panel is connected to the processor unit, BR-520 via CAN bus, or NMEA2000. Power (12 Vdc) is supplied to the main alarm panel from the processor unit via the NMEA2000 cable. The main alarm panel does not have the power switch.

Fig.2.1 shows the block diagram of the main alarm panel.

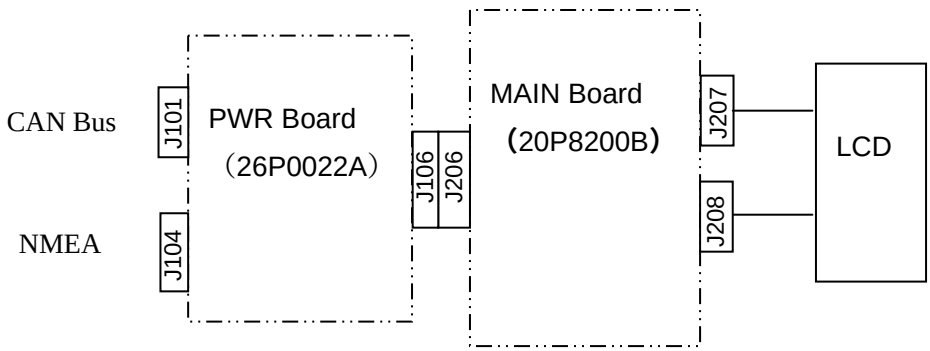

Fig.2.1 Block diagram of Main Alarm Panel, BR-510

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2.2.1 MAIN Board (20P8200B)

There are three types of the MAIN board, 20P8200 as shown in Table 2.2 (reference only). The BR-500 uses the B version of 20P8200. The modification of the board to another version is not recommended, because of the difficulty in soldering and desoldering of small parts.

Table 2.2 MAIN boards

Type	ROM Label	Most Notable Differences	Used in
20P8200	2051530-xx.xx	C70, C98, C99, C104, C105, J209 and U9 are mounted.	GP-33
20P8200A	2651010-xx.xx	Above parts are not mounted.	RD-33
20P8200B	2450056-xx.xx	Above parts are not mounted and type of tactile switches differs.	BR-500

Fig.2.2 shows the block diagram of MAIN board, 20P8200B.

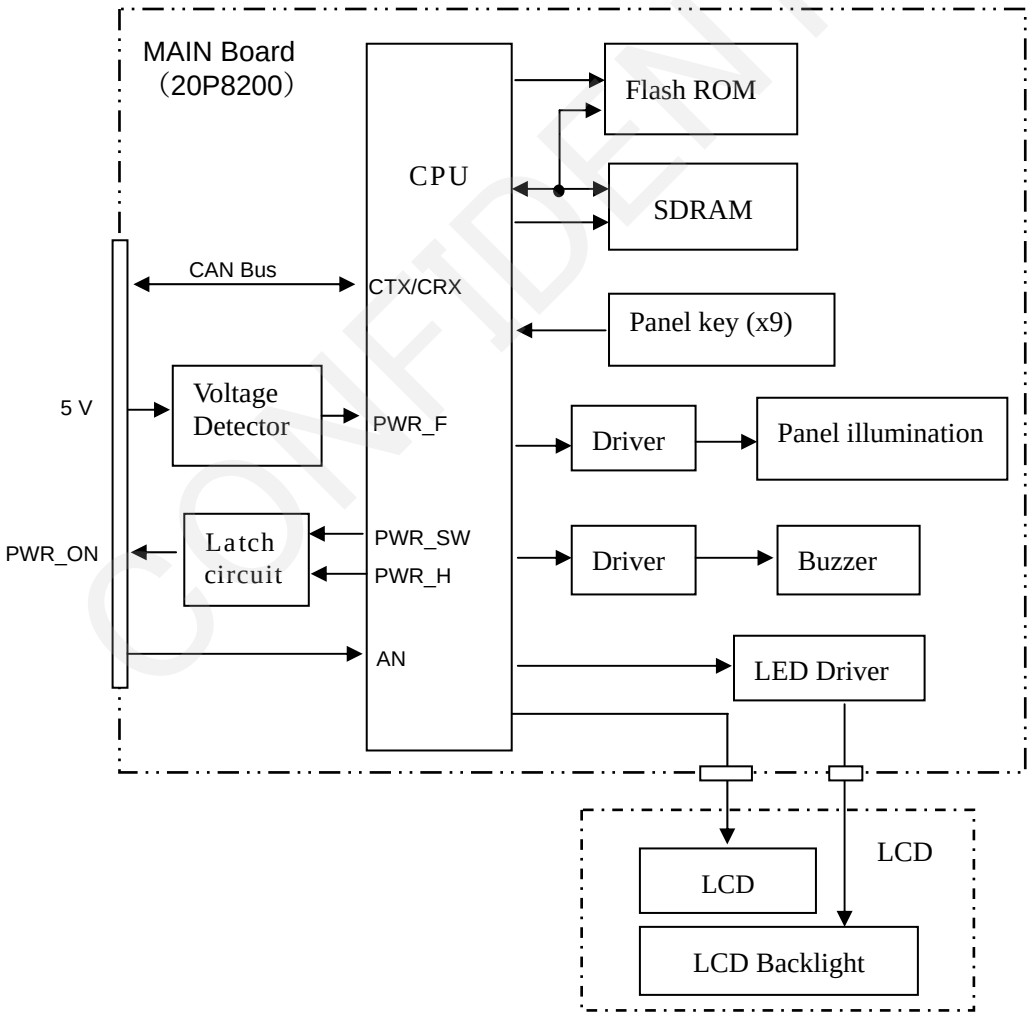

Fig.2.2 Block diagram of MAIN board, 20P8200B

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2.2.2 PWR Board (26P0022A)

The BR-500 uses the PWR board of 26P0022A and the RD-33 of 26P0022.

Fig.2.3 shows the block diagram of the PWR board, 26P0022A consisting of a switching regulator, a CAN bus interface circuit, and a NMEA interface circuit.

Receiving PWR_ON signal from the MAIN board, the switching regulator, U1 generates 5 Vdc. The voltage monitor circuit consisting of CR2, R1, and R2 outputs the AN signal to the MAIN board indicating that power is supplied to the board normally. The monitor circuit does not output the signal when power is not supplied to the BR-510. Using the AN signal, the CPU puts the system into a safe state for shutdown.

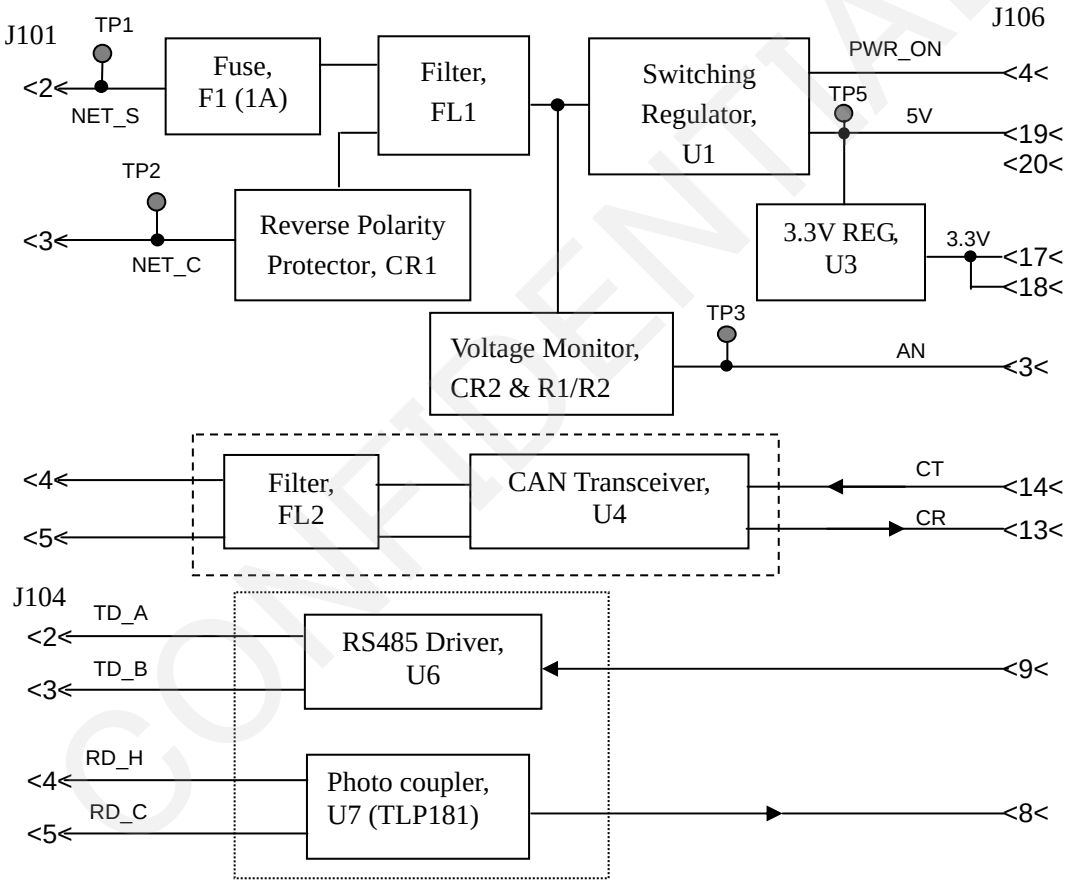

Fig.2.3 Block diagram of PWR board, 26P0022A in BR-510

IMPORTANT!
The switching regulator, U1 is changed from L4971D to LT3991 and the level of PWR board from -22 to -33. The PWR board of 22 is used with the MAIN board of 22 and 33 with 55 (FQ4-2011-037).

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J101 is an NMEA2000 standard connector, or LTW12 of which pin assignments are the following:

Pin 1: Shield (Bare)
Pin 2: NET_C (+12VDC, Red)
Pin 3: NET_S (Ground, Black)
Pin 4: NET_H (CAN High, White)
Pin 5: NET_L (CAN Low, Blue)

Fig.2.4 NMEA2000 connector plug, front view for J101

The NET-H and NET-L are sometimes called CAN-H and CAN-L respectively.

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2.3 Processor Unit (BR-520)

The processor unit consists of MAIN board (24P0104) and a power supply circuit which includes AC line filter, FIL board (24P0110), Power supply (ZWS100BAF-24/FUR), PWR board (24P0105), and a fan motor (MMF-06G12ES-ROD).

2.3.1 MAIN Board (24P0104)

The MAIN board is divided into two circuits: Control and Interface according to its function. Each circuit locates as shown in Fig.2.5.

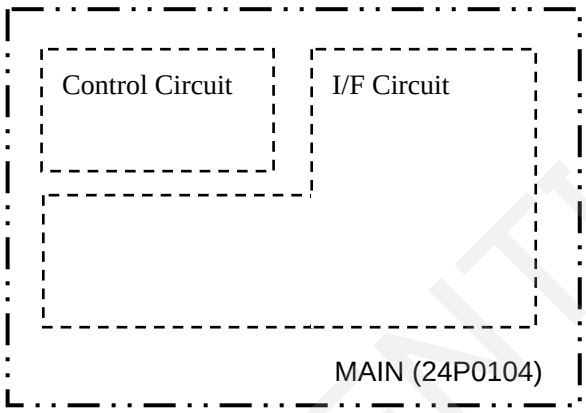

Fig.2.5 Circuits in MAIN board, 24P0104

1) Control Circuit

The CPU in this circuit reads the DIP switch settings, communicates with the main alarm panel (BR-510) and receives AC/DC Power Fail signals from the main alarm panel. Fig.2.6 shows the block diagram of Control Circuit in the MAIN board, 24P0104. The CPLD stands for Complex programmable Logic Device. Refer to Chapter 4 for the function of switches, S1 and S2.

2) Interface Circuit

The interface circuit is further divided into four circuits.

(1) CAN bus I/F circuit (CAN transceiver) to communicate with the main alarm panel.
(2) Digital signal input circuit (Optocouplers, TLP181) to receive a contact signal.
(3) Digital signal output circuit (Digital transistors, DTD114EKT) to output a LVTTL signal.
(4) Serial signal input/output (SIO) circuit (RS422 opto isolator and isolated RS485 full-duplex differential line transceiver, 4800/38400 bps selectable) to output the ALR sentence and update program.

Fig.2.7 shows the block diagram of Interface Circuit on the MAIN board, 24P0104.

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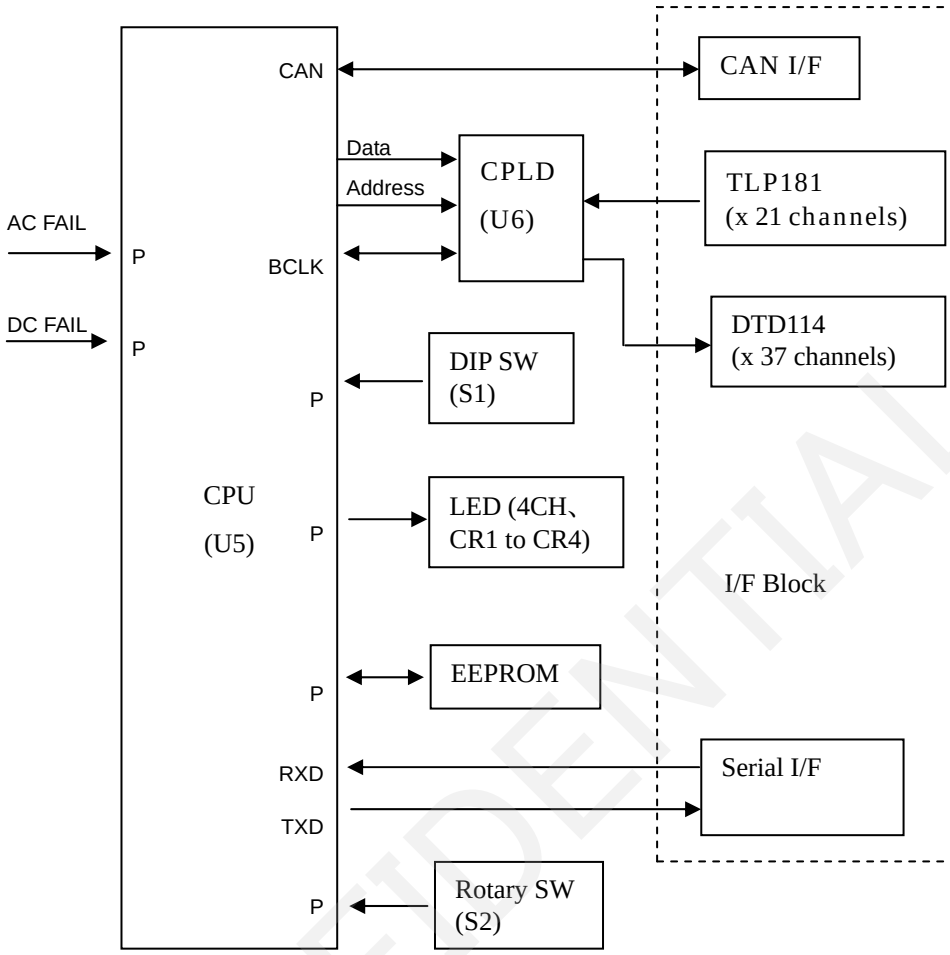

Fig.2.6 Block diagram of control circuit

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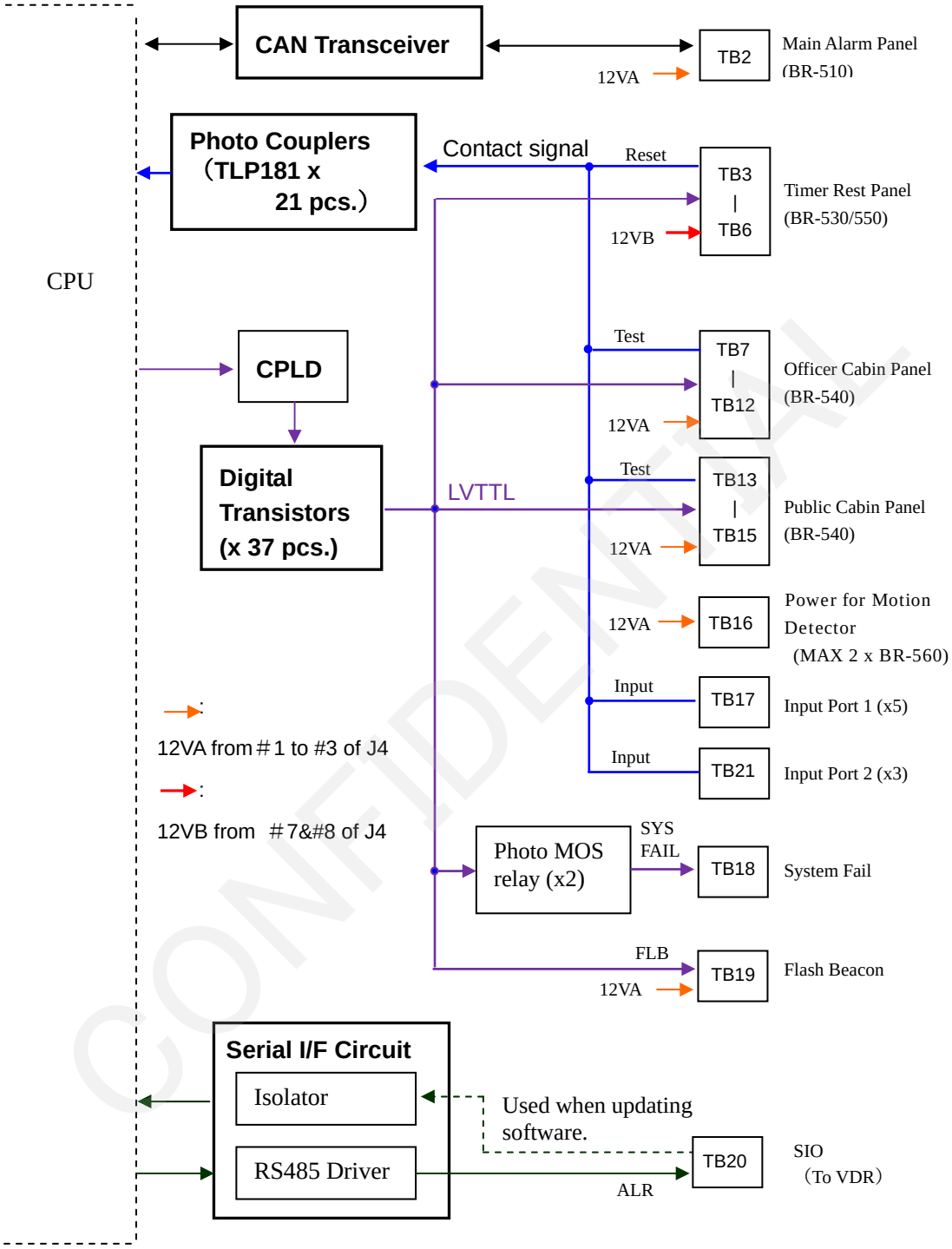

Fig.2.7 Block diagram of Interface circuit

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Table 2.3 shows terminal boards in the processor unit, BR-520 and the units to be connected.

Table 2.3 Terminal boards and Units to be connected

Terminal Board	Unit to be connected	Maximum	Signal
TB1	AC and DC Ship's mains (MSC128(75))	-	100/220V &24VDC
TB2	BR-510 Main Alarm Panel	1 unit	NMEA2000
TB3 to TB6	BR-530/550 Timer Reset Panel	6 units	Contact (NO) & LVTTL
TB7 to TB12	BR-540 Cabin Panel (Officer)	12 units	Contact (NO) & LVTTL
TB13 to TB15	BR-540 Cabin Panel (Public)		
TB16	BR-560 Motion Detector	2 units	12VOUT (Max. 300mA)
TB17 (INPUT1)	Autopilot	1 unit	Contact (NO)
TB17 (INPUT2)*	Trackpilot (Backup Navigator)	1 unit	Contact (NC)
TB17 (INPUT3 to 5)	ECDIS/Radar (Operator Fitness) or Motion Detector	4 units	Contact (NO)
TB18	VDR (System Fail B1/2)	2 units	Contact (NO)
TB19	BR-570 Flash Beacon	3 units	LVTTL
TB20	VDR	1 unit	IEC61162
TB21 (INPUT6 to 8)	ECDIS/Radar (Operator Fitness) or Motion Detector	3 units	Contact (NO)

NO: Normally Open; NC: Normally Close

*: Needs to change service menu setting

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Table 2.4 shows the terminal boards for connection of the timer reset panel and cabin panel.

Table 2.4 Terminal board name of TB3 to TB15

TB #	Terminal Board Name	I/O	Signal Name	Signal Type
TB3 TB4 TB5 TB6	RST_RESET (Timer Reset Panel Reset)	I	Reset	Contact
	RST_BUZ (Timer Reset Panel Buzzer)	O	Buzzer	LVTTL
	RST_LED (Timer Reset Panel Alarm)	O	LED	LVTTL
TB7 TB8 TB9 TB10 TB11 TB12	OF_TEST (Officer Cabin Panel Test)	I	Test	Contact
	OF_BUZ (Officer Cabin Panel Buzzer)	O	Buzzer	LVTTL
	OF_ALM (Officer Cabin Panel Alarm)	O	Alarm LED	LVTTL
	OF_DUTY (Officer Cabin Panel Duty)	O	Duty LED	LVTTL
TB13 TB14 TB15	PB_TEST (Public Cabin Panel Test)	I	Test	Contact
	PB_BUZ (Public Cabin Panel Buzzer)	O	Buzzer	LVTTL
	PB_ALM (Public Cabin Panel Alarm)	O	Alarm LED	LVTTL
	PB_DUTY (Public Cabin Panel Duty)	O	Duty LED	LVTTL

OF: Officer cabin; PB: Public cabin

The cabin panel in the captain's location is connected to TB7, the cabin panel in the officer's locations to TB8 to TB12, and the cabin panel at the locations of further crew members to TB13 to TB15. The cabin panels connected to TB7 to TB12 can be selected as a backup officer.

With the factory default settings, the cabin panel in the officer’s cabin is connected as below.

TB7: Captain
TB8: Chief Officer
TB9: Second Officer
TB10: Third Officer
TB11: Not programmed
TB12: Not programmed

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CAN bus I/F Circuit

The main alarm panel, BR-510 is connected to the processor unit, BR-520 via CAN bus, or NMEA2000. The CAN stands for Controller Area Network. The CAN protocol provides sophisticated error detection mechanisms and the system generates a communication error message, “Failure: Communication” when the communication failure occurs.

The heart of the CAN bus I/F circuit is a CAN transceiver, U31.

The main alarm panel is connected to the TB2 of which pin assignment complies with the NMEA2000 standard; #1: FG; #2: 12VA; #3: GND; #4: NET-H; and #5: NET-L.

The main alarm panel uses 12 V DC from the TB2 in the processor unit as power supply voltage.

Digital Signal Input Circuit

The circuit consists of photocouplers and associated parts to read the status of the switch (open/closed). The input is isolated from the internal circuit with a photocoupler.

Contact signals to be received by this circuit are;

1) Reset signal (Normally Open)
The reset signal from the timer reset panel (BR-530/550), normally open is connected to TB3 to TB6.

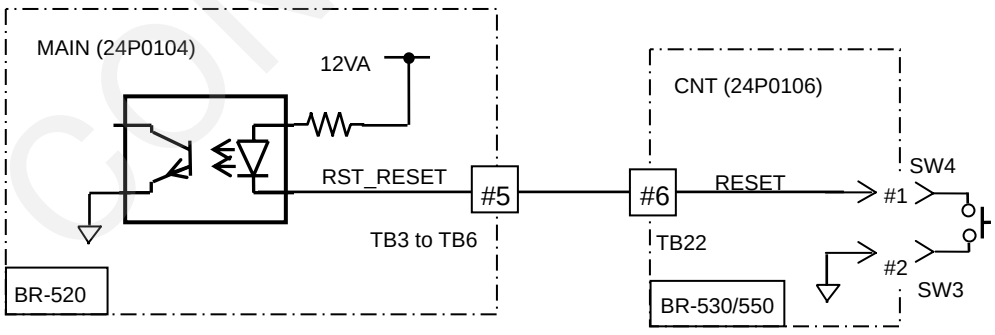

Fig.2.8 Reset signal from CNT board

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2) Test signal (Normally Open)

The test signal from the cabin panel is connected to #6 of TB7 to TB15. The test signal is generated by pressing the Test button on the cabin panel BR-540. When the button is pressed, the switch contact is closed.

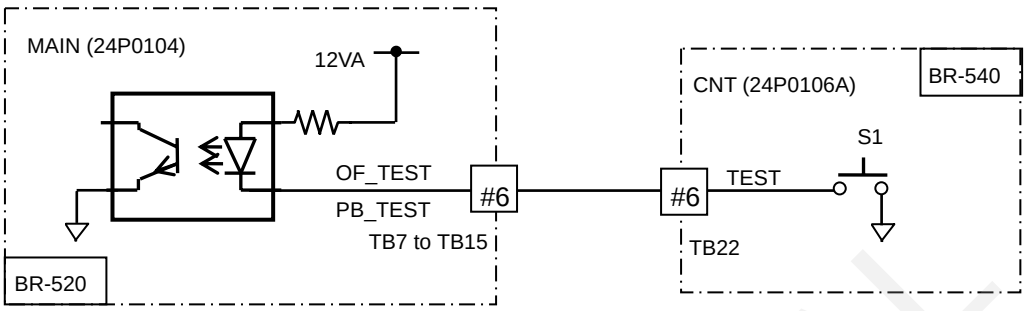

Fig.2.9 Test signal from CNT board

3) INPUT signal

The INPUT signals are the mode signal from autopilot, the backup navigator signal, the operator fitness signal, and the motion detector output. These signals are connected to the INPUT 1 to 8 ports (TB17 and TB21).

(A) Mode signal from autopilot (Normally Open)

The BNWAS incorporates “Automatic” mode which is into operation whenever the ship’s heading or track control system (HCS or TCS) is activated and inhibited when the control system is not activated automatically. This function needs the mode signal from the HCS or TCS.

The INPUT 1 port is intended for exclusive use to connect the normally open (NO) contact signal from the HCS or TCS.

(B) Backup Navigator signal (Normally Close)

The Track Control System (TCS) outputs the backup navigator signal when WP pre-warning and WP alarm are not acknowledged. When the BNWAS receives this signal, an "Emergency Call" is activated immediately.

The Backup Navigator signal, normally close (NC) contact signal MUST be connected to the INPUT 2 port and set the Input Port 2 in the Service menu to Backup Navigator.

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The FEA-2x07 series ECDIS outputs the backup navigator alarm signal from;

1) #3 (RL 3NC) and #4 (RL 3C) of J8 in the LAN adapter, and
2) ST05 in the B-adapter

(C) Operator Fitness signal (Normally Open)

The following equipment outputs the reset signal, called operator fitness signal, normally open (NO) contact signal when the equipment on the bridge is operated.

Model	Output from
FEA-2x07 series ECDIS	#4 (RL 1C) and #5 (RL 1NO) of J6 in the LAN adapter, and ST05 in the B-adapter
FAR-2xx7 series Radar	#7 and #8 (ALARM4) of J612 (Note: ALARM OUT4 in the ALARM menu is set to Operator Fitness.)

The signal is connected to one of INPUT ports, Input 2 to Input 8. When the Input 2 port is used, the Input Port 2 in the Service menu is set to Timer Reset.

(D) Motion Sensor signal (Normally Open)

The motion detector, BR-560 outputs the normally open (NO) contact signal to reset the BNWAS when it is triggered by the officer.

The signal is connected to one of INPUT ports, Input 2 to Input 8. When the Input 2 port is used, the Input Port 2 in the Service menu is set to Timer Reset.

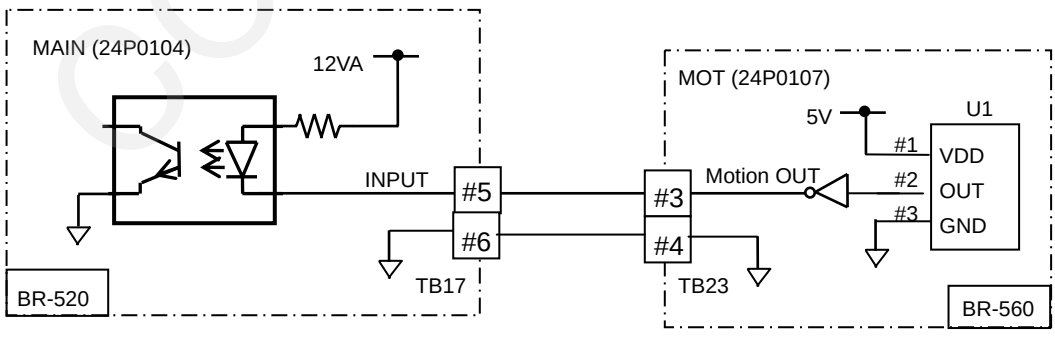

Fig.2.10 INPUT signal from Motion sensor

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Table 2.5 lists the INPUT ports and its usage. The type of contact signal connected to the “INPUT 2” is menu selectable: either normally open (NO) or normally close (NC).

Table 2.5 INPUT ports and its usage

TB#	Pin#	Signal Name	Signal Type	Usage
TB17	#1/#2	INPUT1	Normally Open	**Dedicated port for Autopilot**
	#3/#4	INPUT2	Normally Open*	This port can receive either normal open or normal close signal according to Service menu setting. The normally close signal is typically the Backup Navigator alarm signal.
	#5/#6	INPUT3	Normally Open	The signal to reset the timer, such as Operator fitness signal and the output from the motion detector, BR-560 is connected these ports.
	#7/#8	INPUT4		
	#9/#10	INPUT5		
TB21	#1/#2	INPUT6		
	#3/#4	INPUT7		
	#5/#6	INPUT8		

*: Changeable to Normally Close in the service menu.

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Digital Signal Output Circuit

Table 2.6 shows the output signals from the open collector low-voltage TTL circuit.

Note 1) The second stage alarm is omitted in the Administrator menu.

Note 2) The system is set not to send the second and third stage alarms to the flash beacon with the DIP switch S1 on the MAIN board.

Note 3) The SYS FAIL signal is output from the MOSFET relay, AQW612EHA for opto-isolation of the output from the external circuit.

Note 4) Version 01.06 and later of BR-520 MAIN program outputs the PB_DUTY signal from the second stage or the third stage (menu selectable). V01.05 and earlier outputs the PB_DUTY signal from the second stage alarm.

Table 2.6 Outputs from Open Collector Circuit

Signal Name	Description (Signal Type)	Output to
LED	H/L during a prewarning and the first to third stage alarms	BR-530/550
BUZ	H/L during the first to third stage alarms	
DUTY	All PB_DUTY and OF_DUTY selected by SEL key become H. The status of OF_DUTY1 (captain) signal depends on menu setting.	BR-540
ALM	When an emergency call and the second stage alarm are triggered, all PB_DUTY and OF_DUTY selected by SEL key become H. The status of OF_DUTY1 (captain) signal depends on menu setting. See Note 4.	
BUZ	When the third stage alarm is triggered, all DUTY signal becomes H. Same as ALM signal above	
FLB	H/L during a prewarning and first to third stage alarms (See Note 2.)	BR-570
SYS_FAIL	When the "Failure" message is generated, the system outputs the contact (NO) signal.	VDR

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Serial Signal Input/output Circuit

The BR-500 outputs the ALR sentence to the VDR in IEC 61162 format. The baud rate is selected to either 4800 or 38400 by the DIP switch, S2 on the MAIN board (24P0104) in the processor unit. When upgrading the system, both input and output circuits are used.

ALR Sentence

$BNALR, hhmmss.ss,xxx,A,A,c- -c,*hh<CR><LF>

- hhmmss.ss: This part may be left blank if the BNWAS does not include UTC time information
- xxx: Designation of source of alarm or source of reset command. The automatic mode is designated as "000".
- A: A = Dormant period exceeded
  V = Dormant period not exceeded
- A: A = Alarm acknowledged
  V = Alarm unacknowledged
- c - - c: BNWAS mode (see 3.1.1): c1; c2; c3
  c1 = AUT, MAN, or OFF
  c2 = Dormant period in min, (03 – 12)
  c3 = Alarm stage: 1, 2, or 3.

Example: $BNALR,,000,A,V,C1=AUT;C2=03;C3=1*hh<CR><LF>

A terminating resistor is installed across the RDA and RDB lines. If necessary, remove this resistor by changing the short plug from #1/#2 (Factory setting) to #2/#3. In most cases, it is not necessary to remove the resistor.

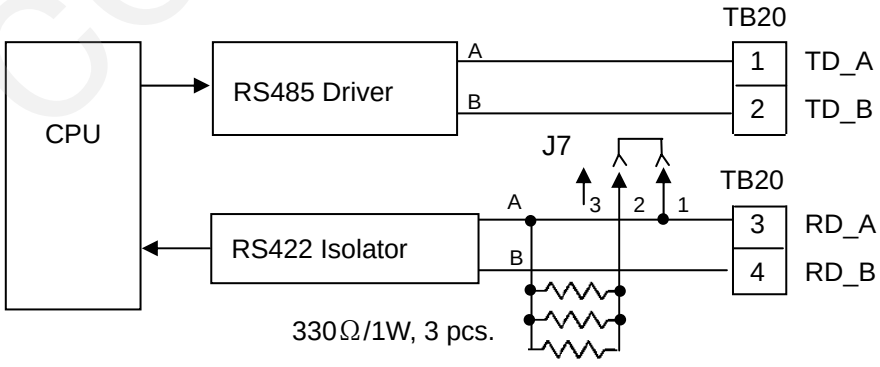

Fig.2.11 Terminating resistor in serial input circuit

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2.3.2 Power Supply Circuit

Fig.2.12 shows the block diagram of the power supply circuit in the processor unit, BR-520. The circuit generates 12VA, 12VB, and 5V, and sends them to the MAIN board, 24P0104.

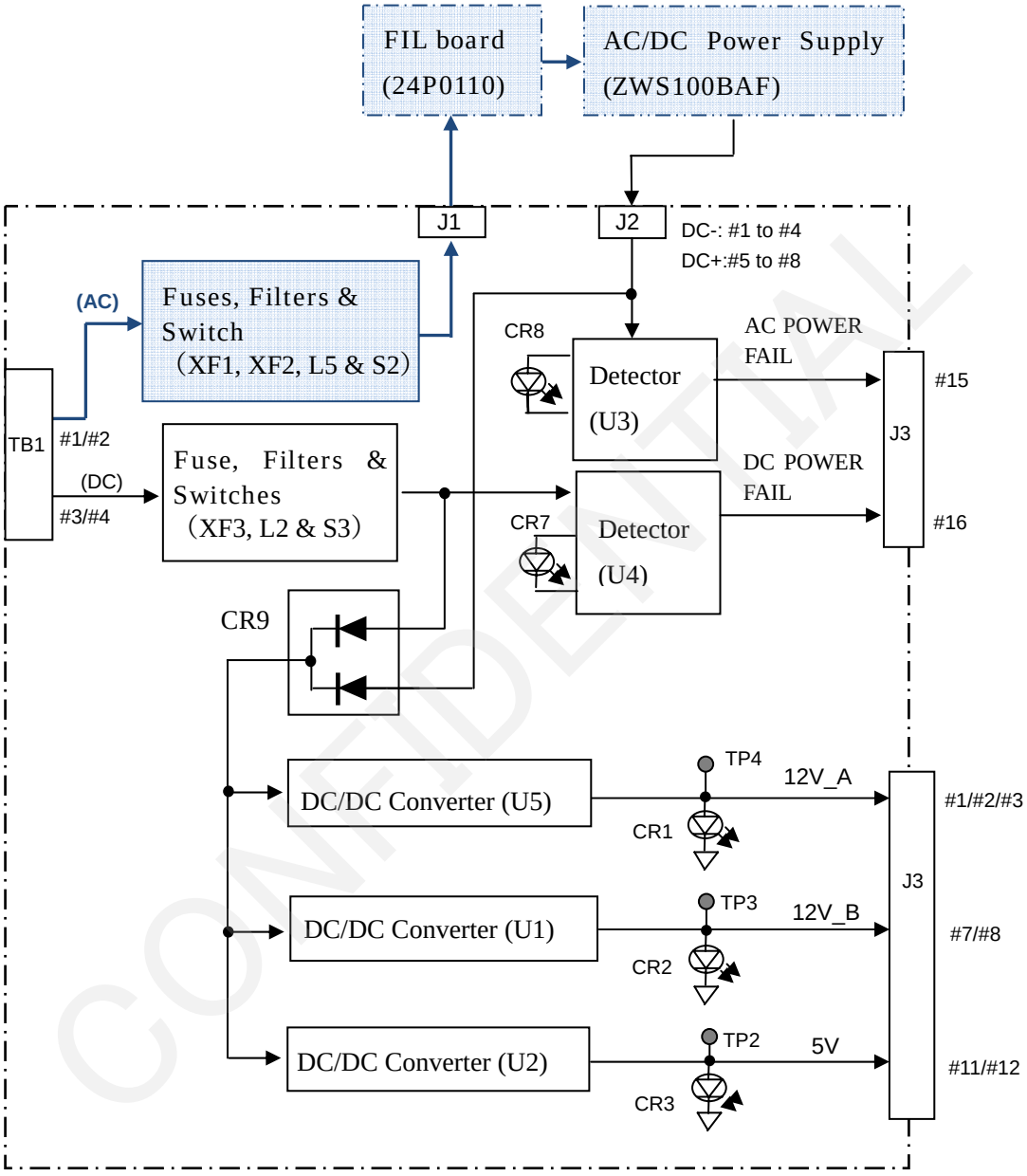

Fig.2.12 Block diagram of power supply circuit in BR-520

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2.3.3 Checking Connection to Processor Unit

The following operation generates the test signal from the timer reset panel and the cabin panel for checking connection to the processor unit.

Unit	Operation to generate TEST signal
BR-530	Pressing and holding down RESET button for five seconds or more
BR-540	Pressing TEST button

Receiving the Test signal, the CPU in the processor unit outputs an ACK signal for five seconds to the panel through the LED and buzzer lines.

If the LED and buzzer on the panel activate for five seconds after pressing the TEST button, the connection between the panel and the processor unit is good.

This test function is disabled when the cabin panel is connected to the processor unit with a four core cable.

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2.4 Timer Reset Panel (BR-530/550)

Fig.2.13 shows the general circuit diagram of the timer reset panel, BR-530/550.

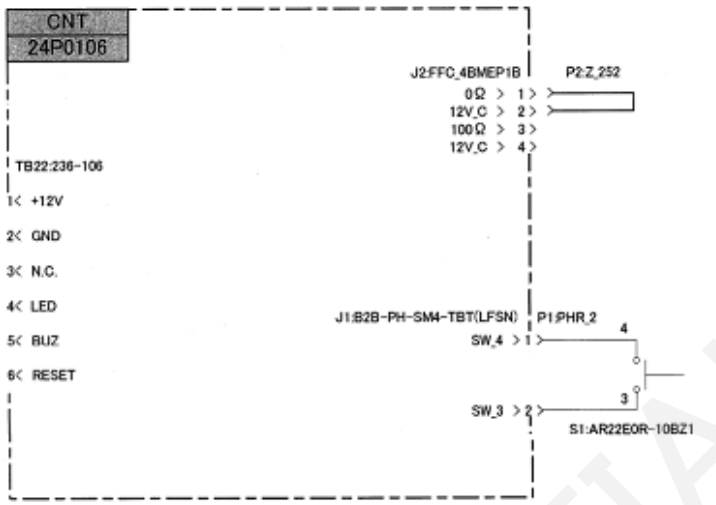

Fig.2.13 General circuit diagram of Timer Reset Panel, BR-530/550

The Timer Reset Panel uses the CNT board of 24P0106. Table 2.7 shows differences between 24P0106 for the timer reset panel and 24P0016A for the cabin panel. In the table, "X" means that the part is mounted.

Table 2.7 Differences between 24P0106 and 24P0016A.

P.C.B.	Used for	JP1	JP2	S1	J1	CR2	CR3	R3
24P0106	BR-530/550		X		X	*2	UY1105W	470, 1/2W
24P0106A	BR-540	X	*1	X		*2	UR1105W	910, 1/2W

*1: None (until June 2011) and 0.1uF (from July 2011)

*2: BR-530: HUG1105W-TR (until December 2011) and PG1102W-TR (from 2012)
BR-540: same as BR-530
BR-550: HUG1105W-TR

Function of 24P0106

The board is divided into two circuits: LED and buzzer. The tactile switch, S1 is not mounted on this board.

In the LED circuit, CR2 is the green RESET LED and lights when the system is on. CR3 is the yellow ALARM LED and lights when receiving the LED alarm signal from the processor unit at #4 (LED) of TB22.

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R2 and R3 preset the brightness of CR2 and CR3 respectively. The brilliance of ALARM LED is adjusted through the BRILL window on the Main Alarm panel. (The CPLD should be V01.02 or later.)

The buzzer circuit consists of LS1, LS2, Q1 to Q4 and U1. The buzzer sounds when the H signal is received at #5 (BUZ) of TB22.

The performance standard IEC62616 defines the sound pressure level of the BNWAS 1 m from the source as below.

(a) First stage bridge audible alarm: At least 75 dB (A) but not greater than 85 dB (A)

(b) Second and third stage remote audible alarm:
At least 75 dB (A) but not greater than 120 dB (A).

Thus, the sound pressure level of the piezoelectric buzzer in the BR-530/550 timer reset panel and BR-540 cabin panel is at least 75 dB, but not greater than 85 dB.

The jumper plug on J2 selects a resistor to adjust the sound pressure level. Placing the plug between pins #1 and #2 selects 0 ohm, 1/2W (R13) and pins #3 and #4, 100 ohms (R14) connected to the power supply line in series.

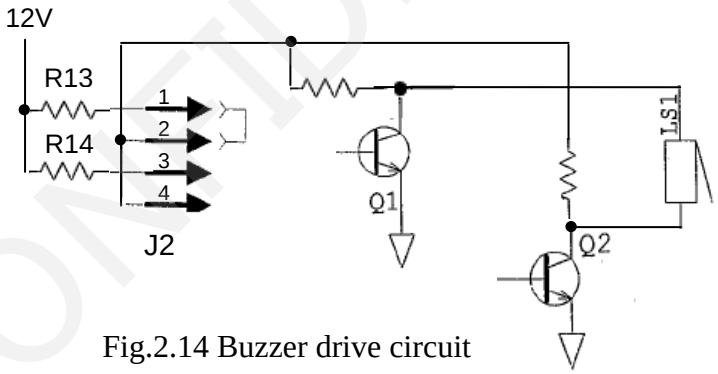

Fig.2.14 Buzzer drive circuit

NEVER change the jumper plug on J2.

The buzzer frequency is set to 4.15 kHz, 4.2 kHz, or 4.25 kHz with the rotary switch S2 on the MAIN board in the Processor unit. See section 4.8.

The RESET button, or push button S1 on the Timer Reset panel is connected to #1 and #2 (GND) of J1 on the CNT board.

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2.5 Cabin Panel (BR-540)

Fig.2.15 shows the general circuit diagram of the cabin panel, BR-540.

The cabin panel uses the CNT board of 24P0106A consisting of a DUTY LED (CR2), an ALARM LED (CR3), buzzers (LS1 and LS2), and a tactile switch (S1).

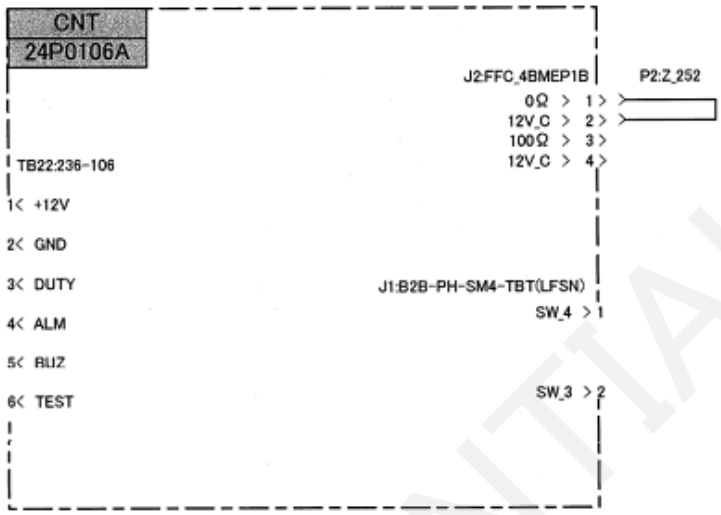

Fig.2.15 General circuit diagram of Cabin Panel, BR-540

Function of 24P0106A

This board has the same functions as 24P0106 except for the following points.

CR2 is the green DUTY LED which comes on when the DUTY signal (L) is received at #3 (DUTY) of TB22 while CR3 the red ALARM LED which comes on when the ALM signal (L) at #4 (ALM) of TB22.

The tactile switch, S1 is a test button which generates the test signal.

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2.6 Motion Detector (BR-560)

Fig.2.16 shows the general circuit diagram of the motion detector, BR-560.

The MOT board, 24P0107 used in the motion detector mainly consists of a motion sensor U1 (EKMC1601111) and a three-terminal voltage regulator U2 (TA78L05F).

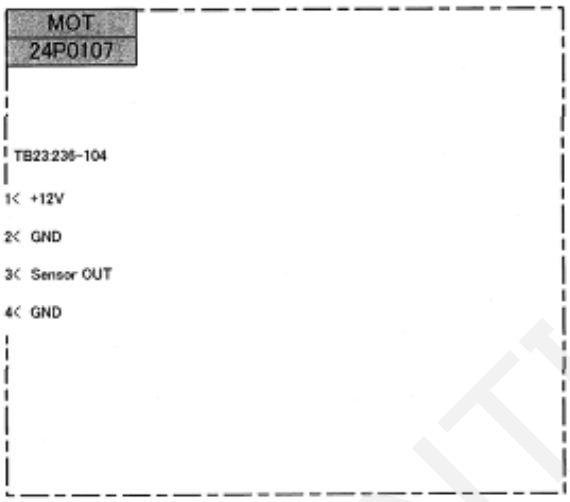

Fig.2.16 General circuit diagram of Motion Detector, BR-560

The sensor output is connected to #3 (Motion OUT) of TB23 via an inverter Q1. See Fig.2.17.

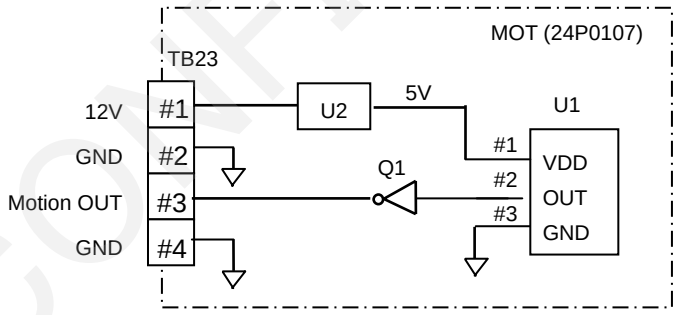

Fig.2.17 Simplified circuit diagram of MOT board

Specification of Motion Sensor

Detection range: Maximum 5 m
Detection Area (Angle): ± 40
Movement speed: 1.0 m/s
Target size: 700 x 250 mm

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Figs.2.18 and 2.19 show the block diagram and pin assignment of the motion sensor respectively.

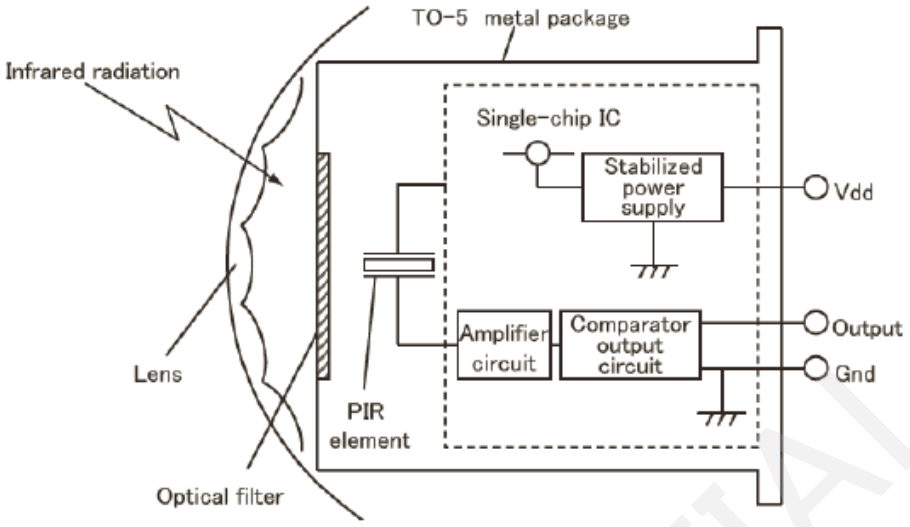

Fig.2.18 Block diagram (Digital output circuit) of Motion Sensor

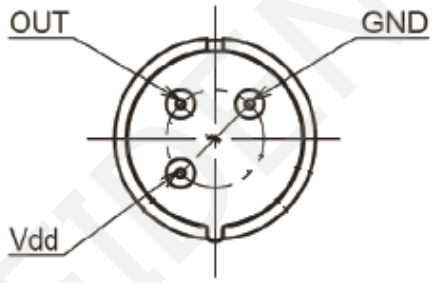

Fig.2.19 Pin assignment of Motion Sensor (Bottom view)

Fig.2.20 shows the sensor output signal. The Circuit Stability Time (Twu) is about 30 seconds (maximum). During this stage, the output status is undefined (ON/OFF) and detection is therefore not guaranteed.

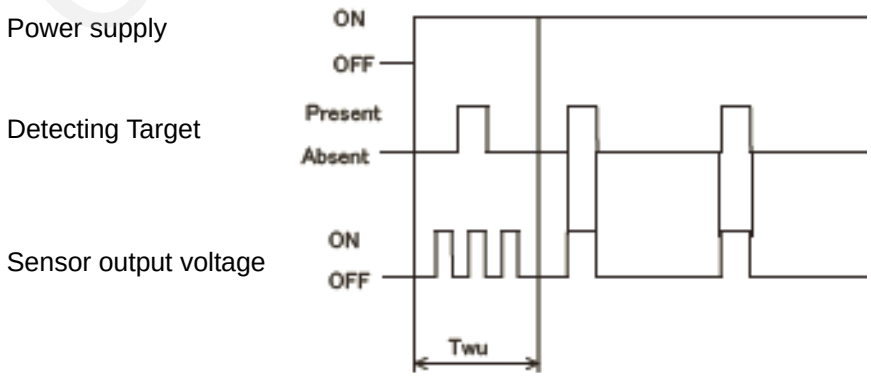

Fig.2.20 Sensor output voltage

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The Motion Sensor is a pyroelectric infrared sensor that detects variations in infrared rays. However, it may not detect in the following cases: lack of movement, no temperature change in the heat source. Besides, it could also detect the presence of heat sources other than a human body. Efficiency and reliability of the system may vary depending on actual operating conditions:

1) Detecting heat sources other than the human body, such as:
   a) Small animals entering the detection area.
   b) White light source (sunlight, car headlights, etc.) directly hitting the sensor.
   c) Sudden temperature changes in the detection area caused by humidifier water vapor emission, or air conditioning system hot/cold air emissions.

2) Difficulty in sensing the heat source
   a) Glass, acrylic or similar materials standing between the target and the sensor may not allow a correct transmission of infrared rays.
   b) Non-movement or quick movements of the heat sources inside the detection area.

3) Expansion of the detection area
   In case of considerable difference in the ambient temperature and the human body temperature, detection area may be wider apart from the configured detection area.

4) Other handling cautions
   (1) Degradation of detecting performance will happen if dirt and dust adhere to the lens.
   (2) The lens of the Polyethylene lens type is made of soft materials (Polyethylene). If any loads or shocks are applied to the lens, due to deformities, and damages, this will lead to malfunction, or deterioration of performance.
   (3) The sensor may be damaged by ±200 volts of static electricity. Avoid direct hand contact with the pins and be very careful when operating the product.

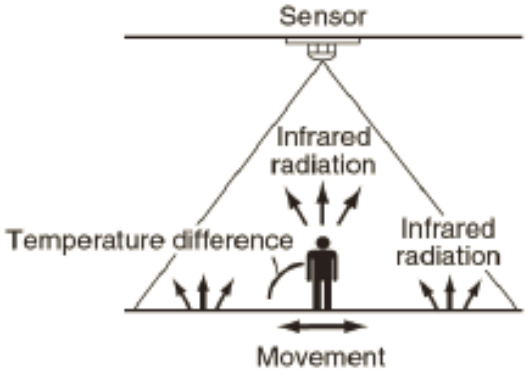

Fig.2.21 How sensor works

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2.7 Flash Beacon (BR-570)

Fig.2.22 shows the general circuit diagram of the flash beacon, BR-570.

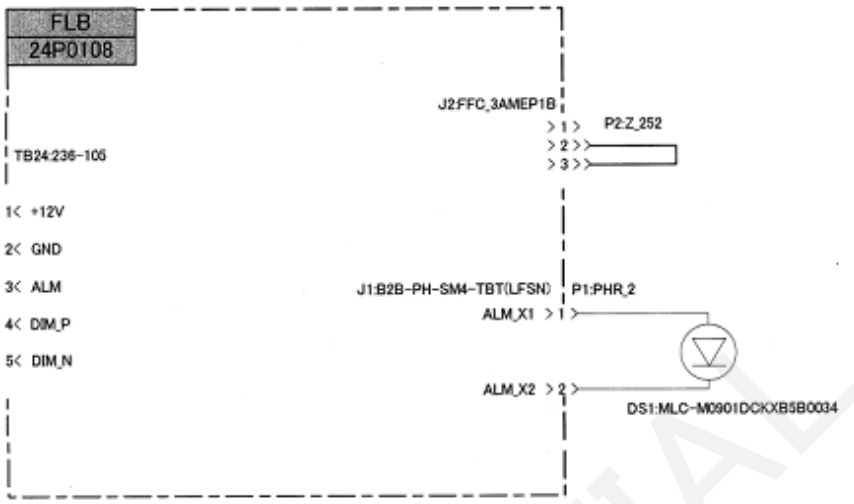

Fig.2.22 General circuit diagram of Flash Beacon, BR-570

The leads L1 and L2 on the light, DS1 (Type:LC-M0901DCKXB5B0034, C/N:00017439010) are connected to #1 and #2 of J1 on the FLB board, 24P0108 respectively.

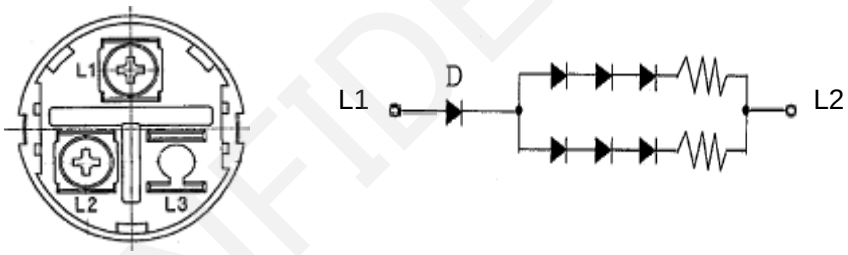

Fig.2.23 Bottom view of DS1

The FLB board includes the preset dimmer R2. When R2 is used, the short plug is placed between #2 and #3 on J2. See Fig.2.24.

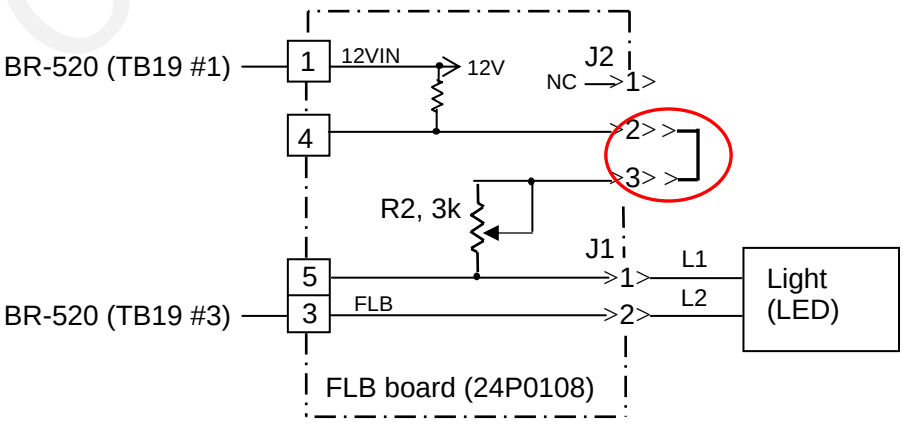

Fig.2.24 Using internal dimmer, R2

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When an external dimmer (3k ohms) is used, connect it between #4 and #5 on TB24 and the short plug is placed between #1 and #2 on J2. See Fig.2.25.

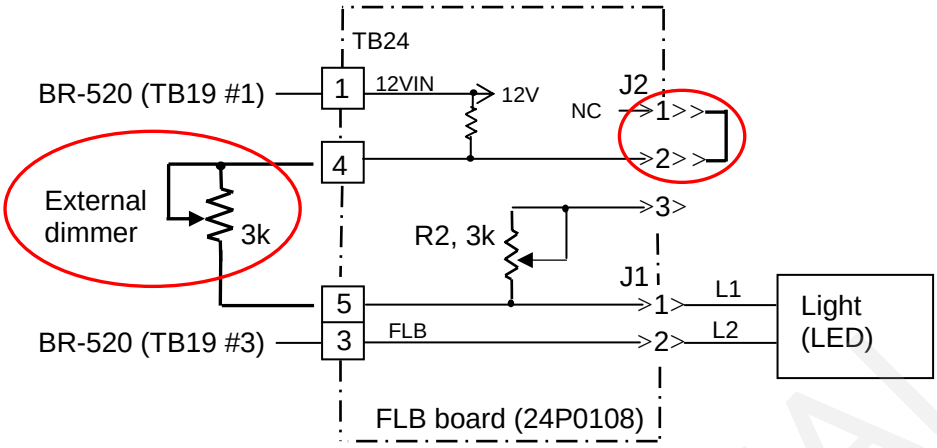

Fig.2.25 Connecting external dimmer

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Chapter 3 Location of Parts

3.1 Main Alarm Panel (BR-510)

Fig. 3.1 Front Panel 510, Front view

Rubber key 510 (24-012-1102)

Fig. 3.2 Front Panel 510, Rear view

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MAIN ALARM PANEL TYPE BR-510
SER.NO. 000118
COMPASS SAFE DISTANCE
STD 0.60 m STEER 0.40 m
FURUNO ELECTRIC CO., LTD.
Designed by FURUNO in Japan / Made in China
CAN bus NMEA
J101 (CAN Bus)
Watertight cap, MJ-AC
(J104, NMEA)

Fig. 3.3 Main Alarm Panel, Rear view

Fig. 3.4 Main Alarm Panel without front panel 510

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Fig. 3.5 BR-510 Rear cover with PWR board

Fig. 3.6 BR-510 with front and rear covers removed

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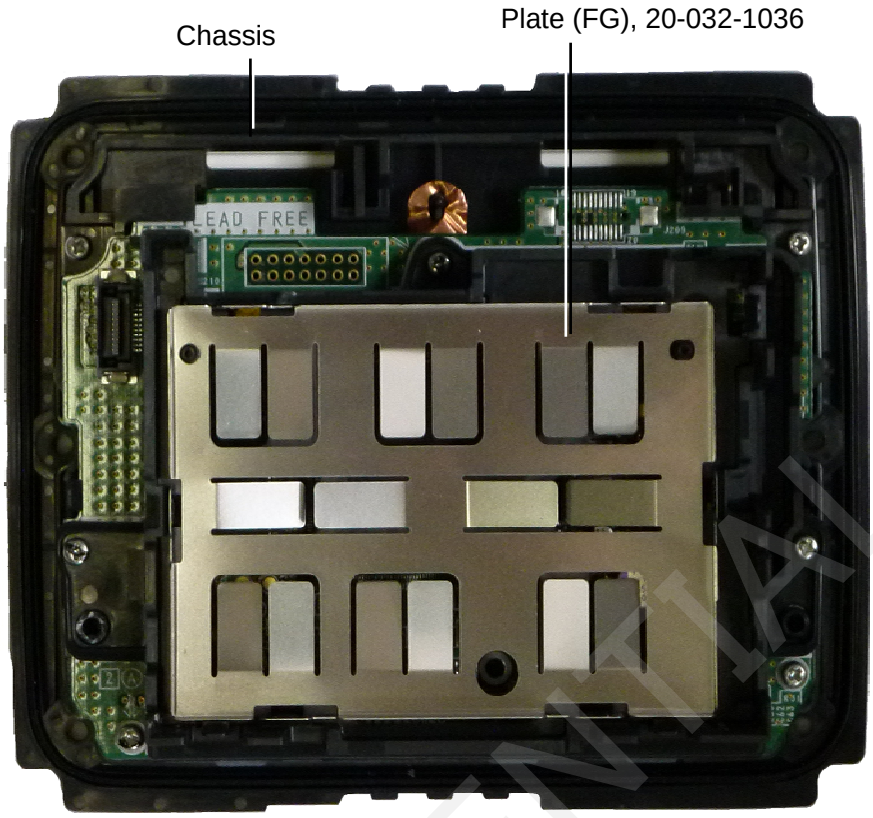

Fig. 3.7 BR-510 rear view with rear cover removed

Fig. 3.8 BR-510 rear view with PLATE (FG) removed

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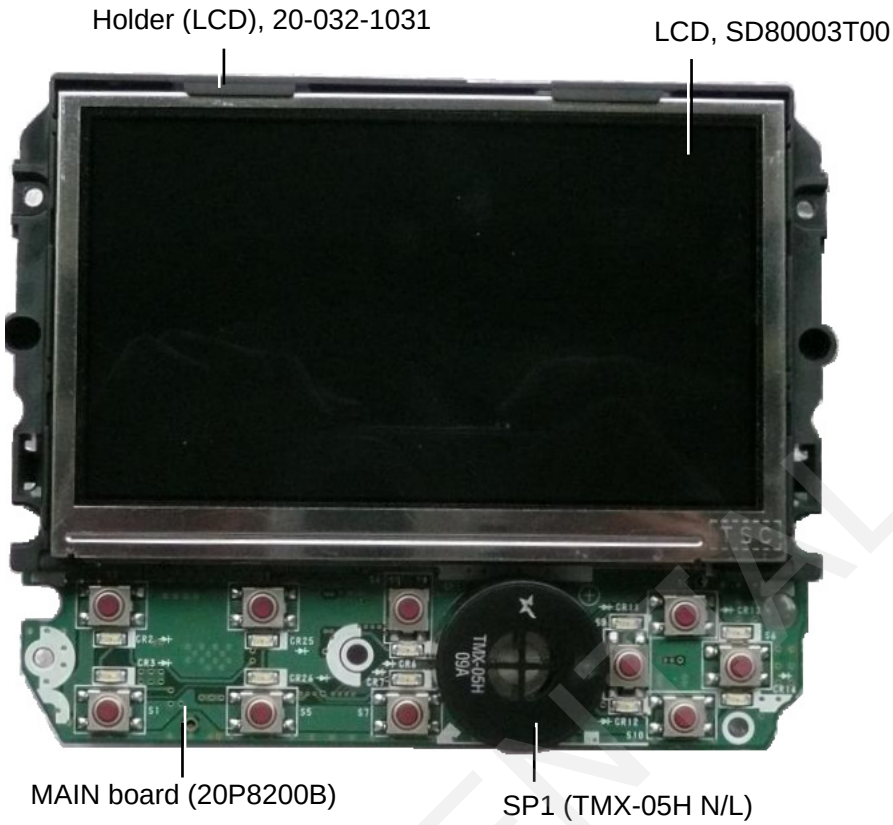

Fig. 3.9 MAIN board with Holder (LCD), Front view

Fig. 3.10 MAIN board with Holder (LCD), Rear view

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Fig. 3.11 MAIN board assembly

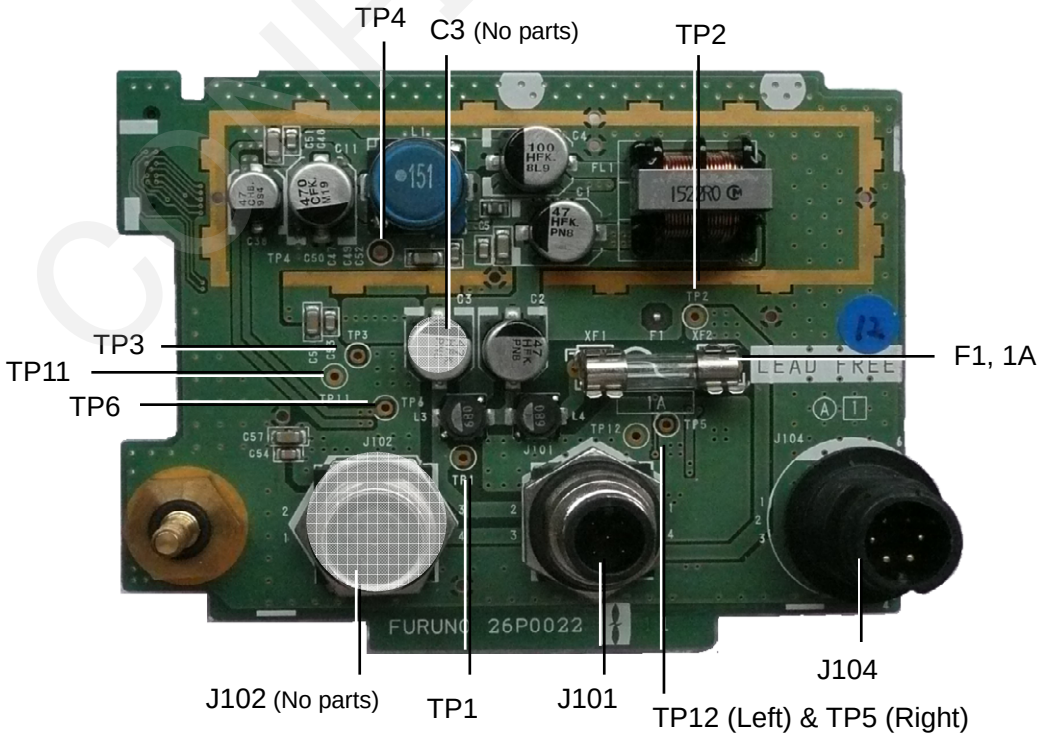

Fig. 3.12 PWR board (24P0022A), Parts side

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3.2 Processor Unit（BR-520）

(A) Processor Unit with PWR board (-11)
The processor unit with the shield case was produced until around June 2011.

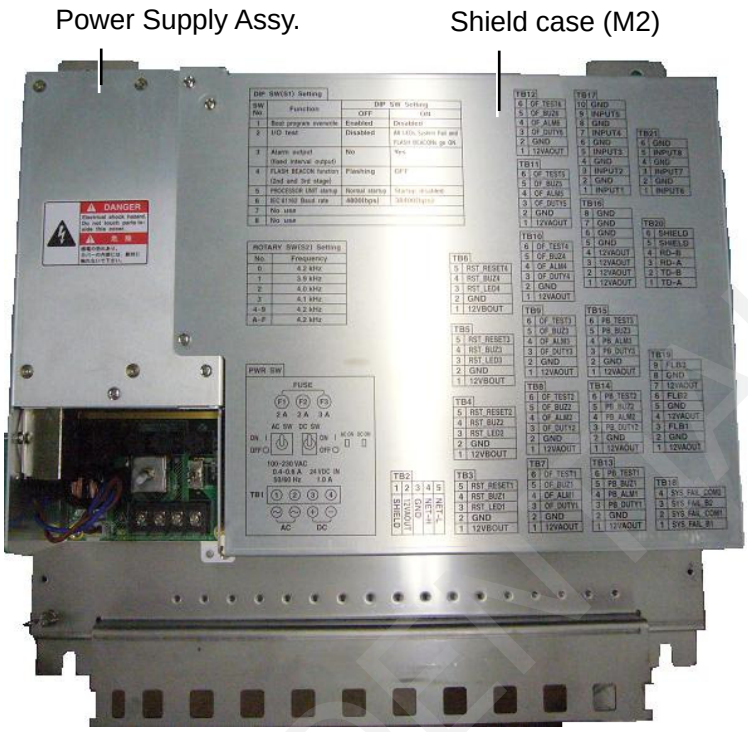

Fig. 3.13 Processor unit with cover removed (Original type)

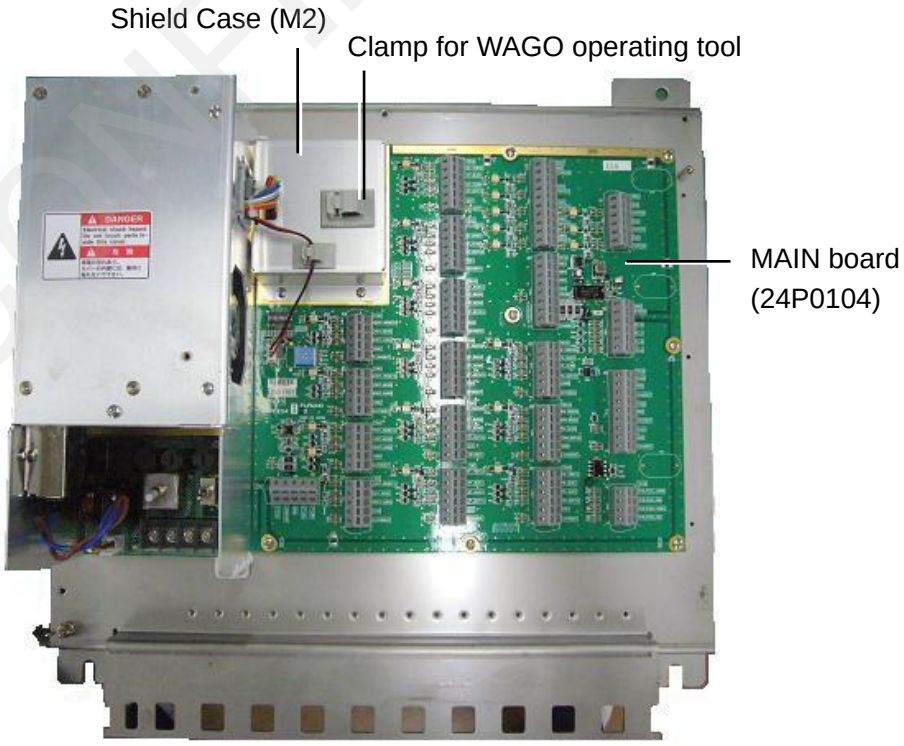

Fig. 3.14 Processor unit with cover removed (Original type)

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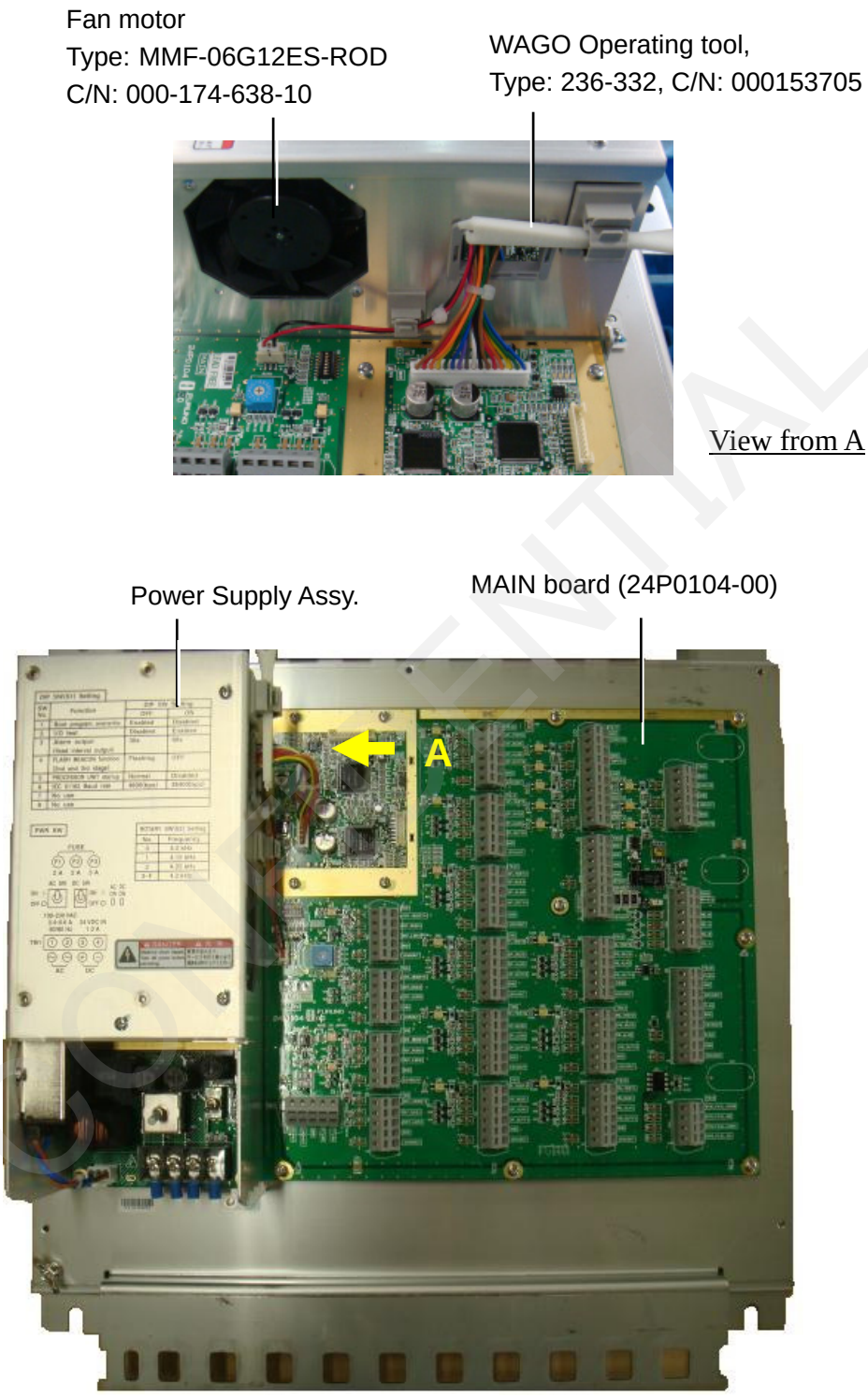
(B) Processor Unit with PWR board (-22)



Improving the EMC quality on the PWR board (-22), shield cases M1 and M2 and the EMI cores are deleted. (From productions in July 2011)

Fig. 3.15 Processor unit with cover removed (Current type)

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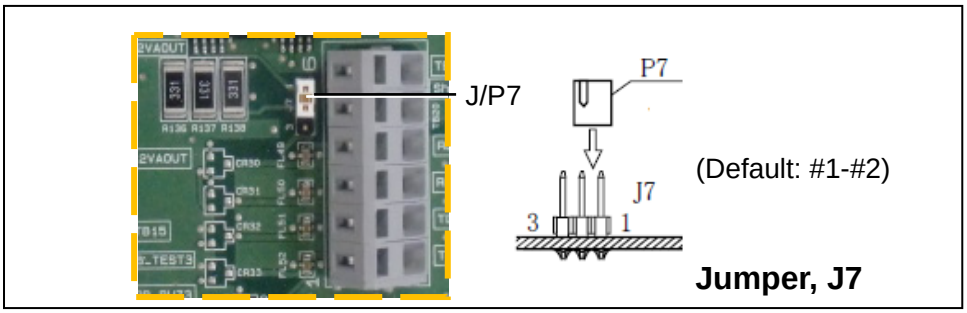
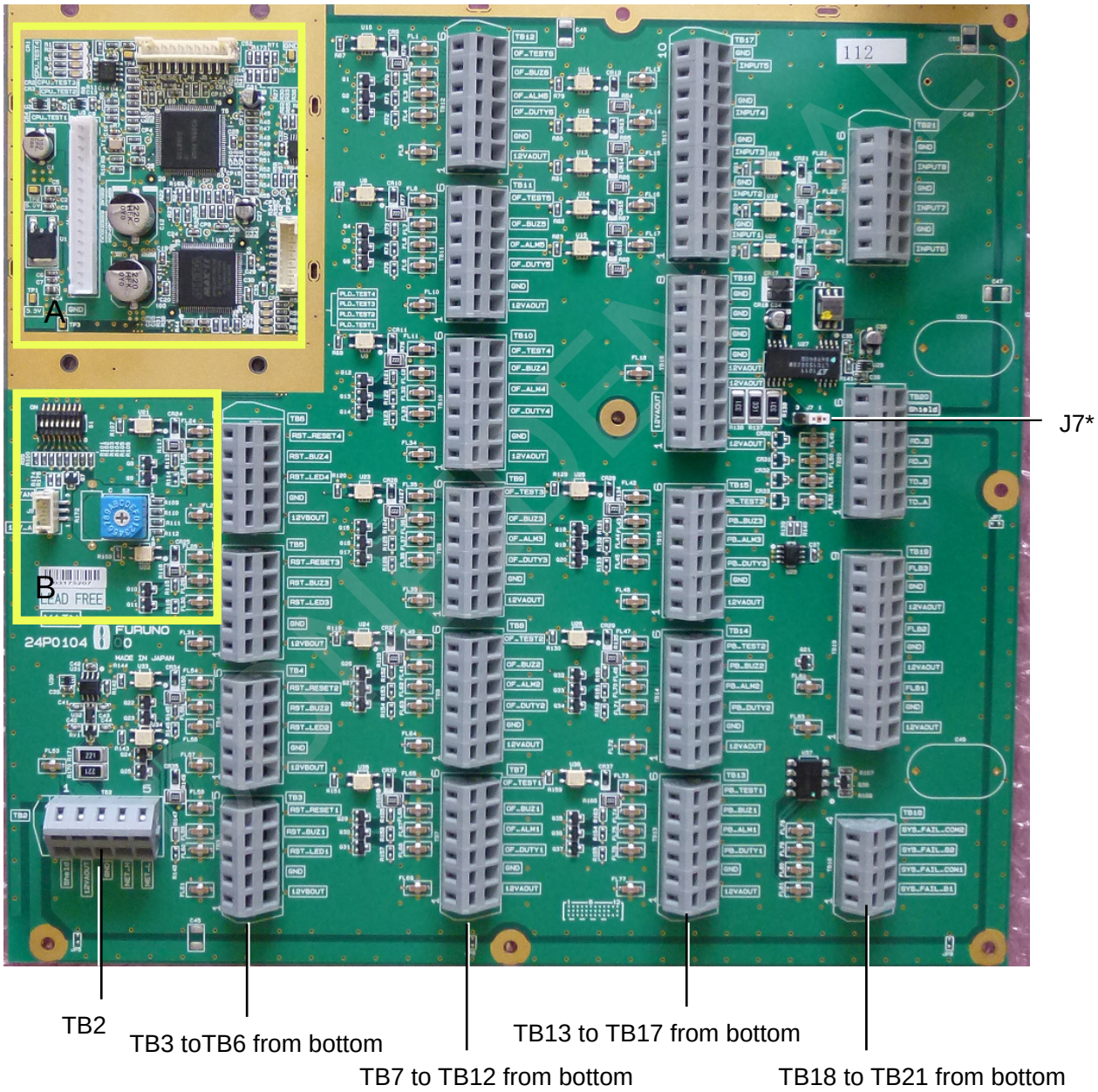


See enlarged views (Figs.3.17 and 3.18).



*: On the MAIN board of -11 and later, J7 is mounted in paralle with the terminal board (The bottom pin is #1).

Fig. 3.16 MAIN board (24P0104)

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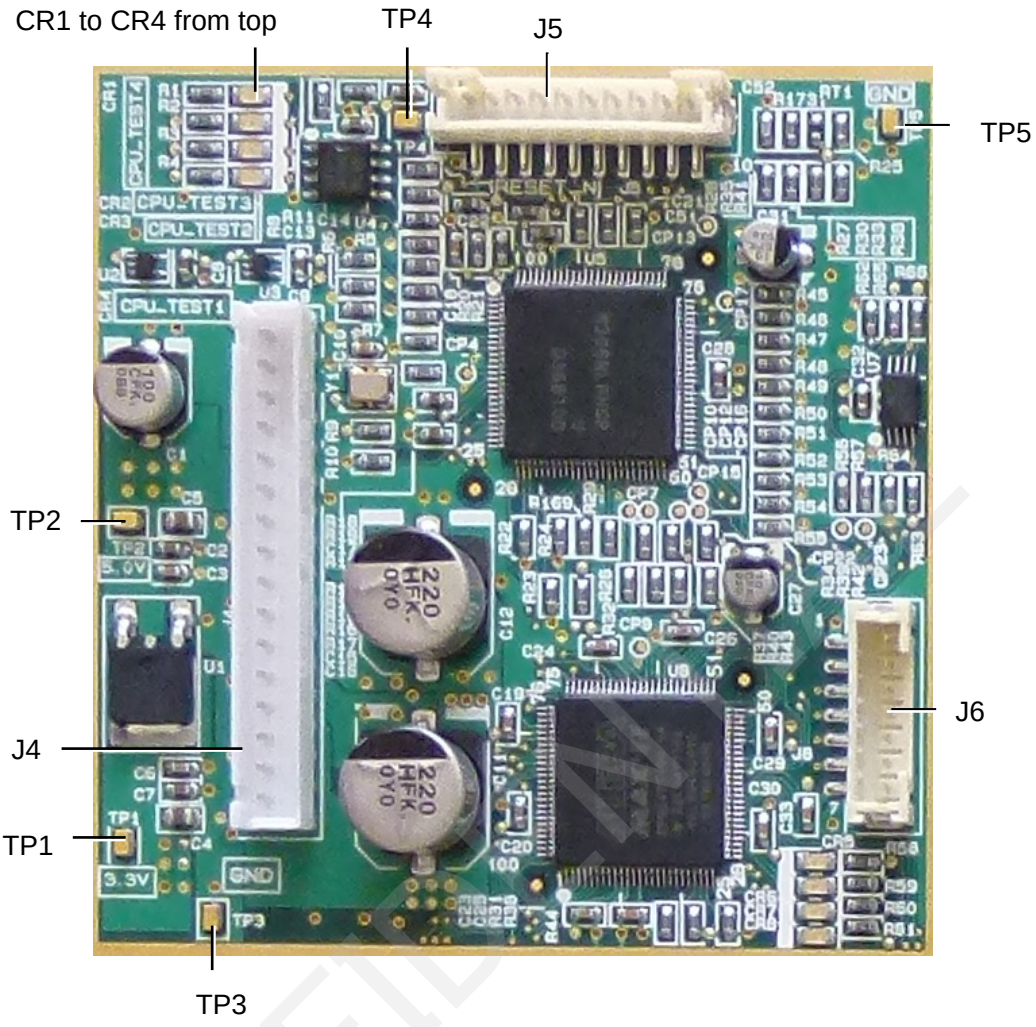

Fig. 3.17 Enlarged view of A in Fig.3.16

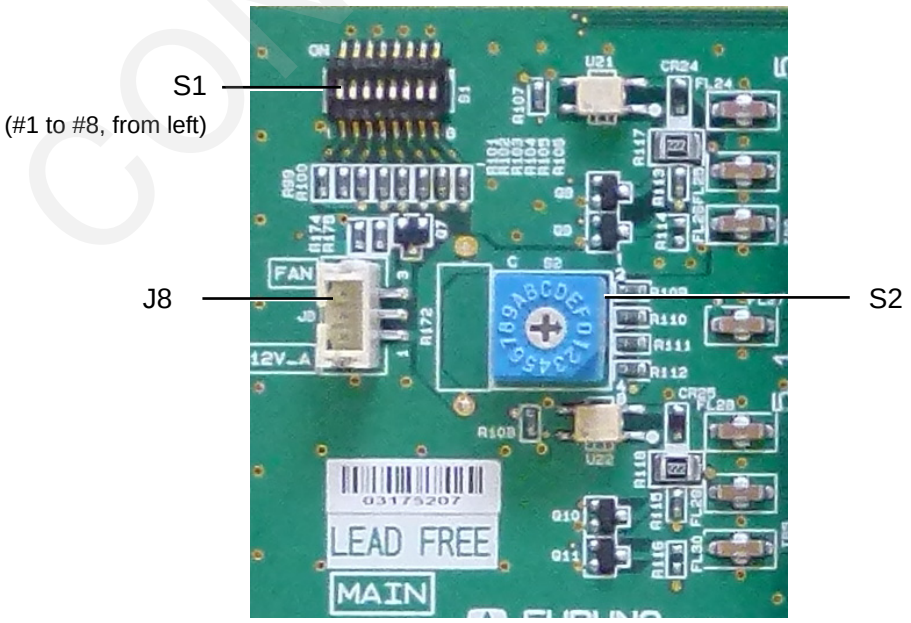

Fig. 3.18 Enlarged view of B in Fig.3.16

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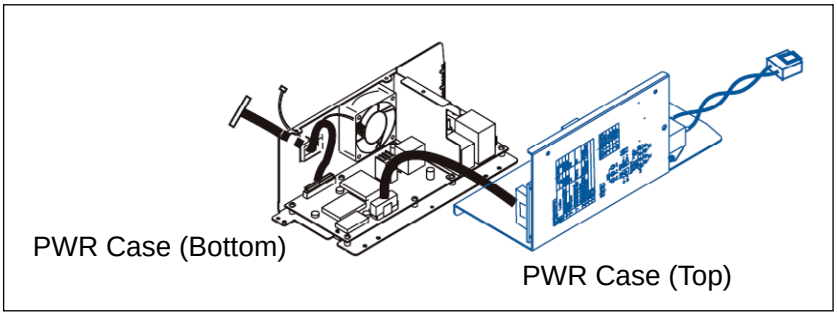

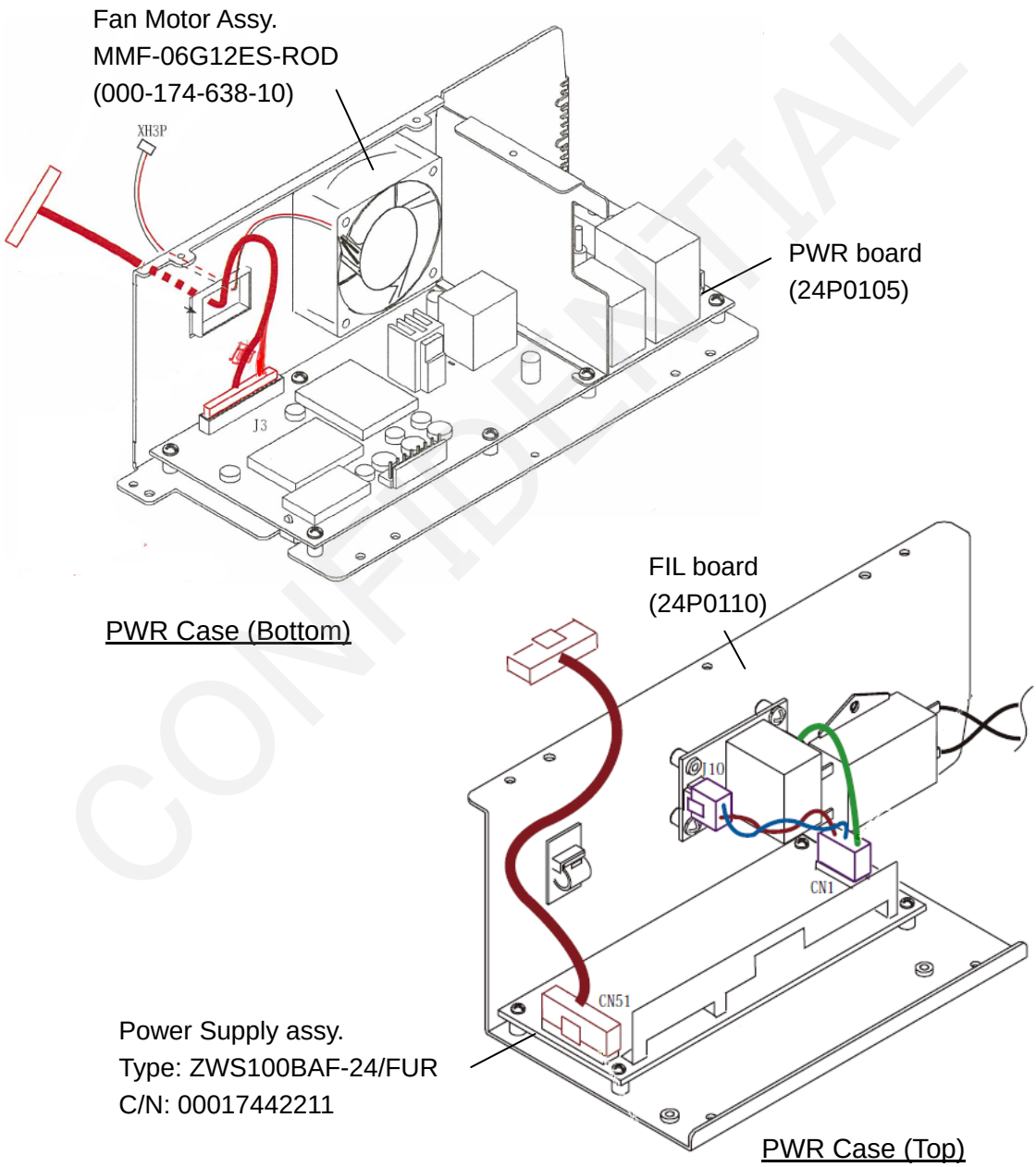

Fig. 3.19 Power Supply Assembly

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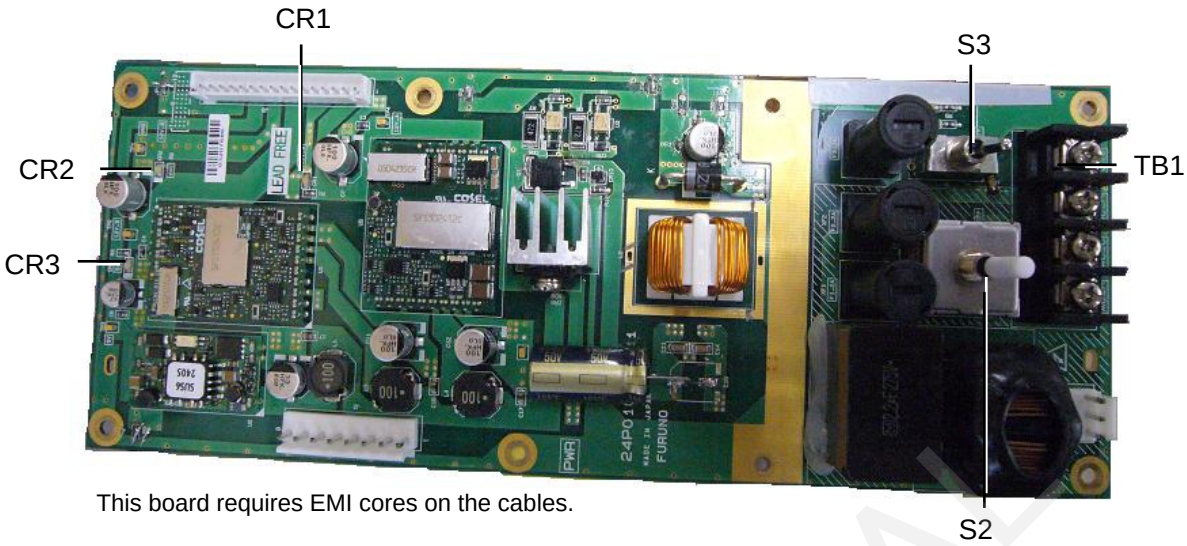

Fig. 3.20 PWR board, 24P0105-11

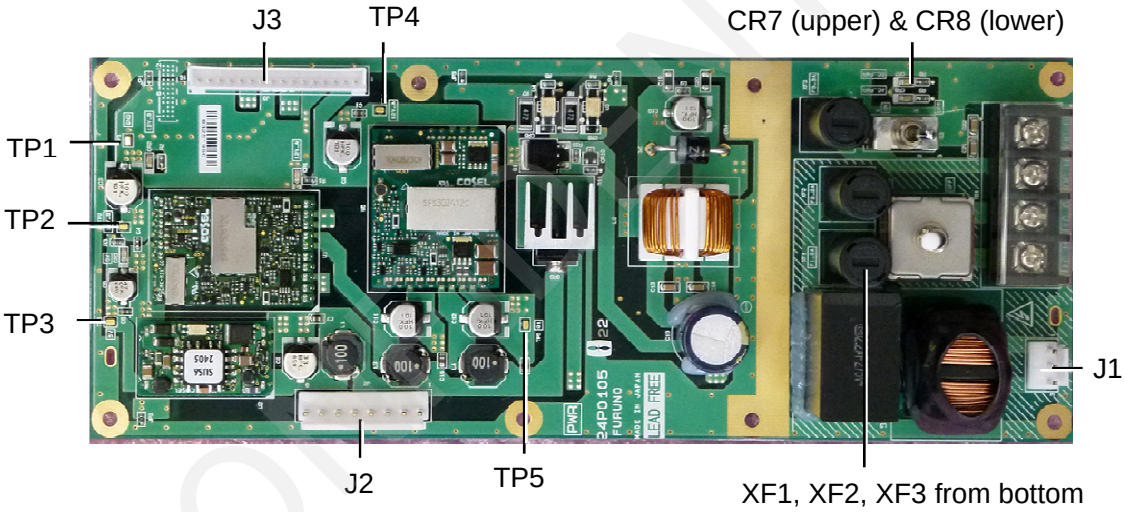

Fig. 3.21 PWR board, 24P0105-22 (from July 2011)

Fig. 3.22 ZWS100BAF-24/FUR

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3.3 Timer Reset Panel and Cabin Panel (BR-530/540)

The BR-540 does not have the push buttton.

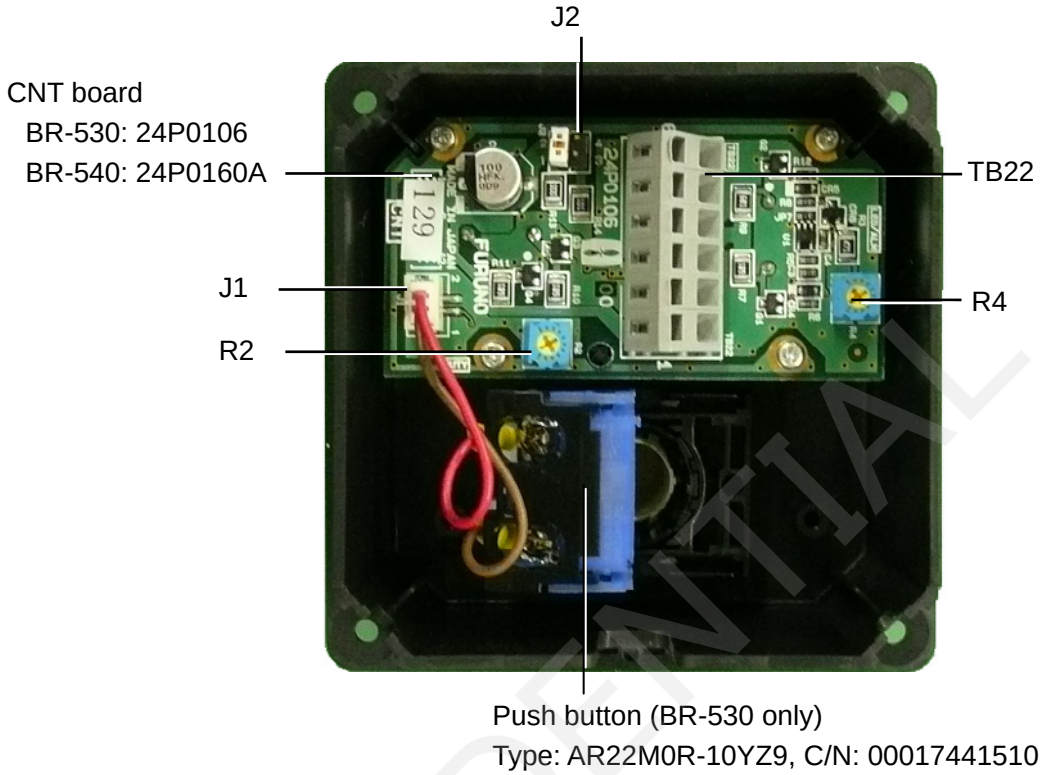

Fig.3.23 BR-530/540 with cover removed

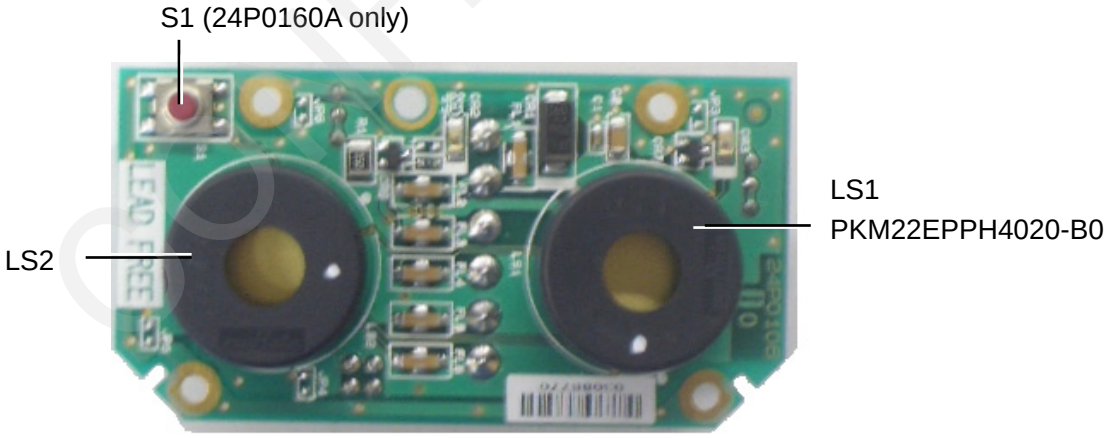

Fig.3.24 CNT board (24P0106/A), Sodering side

3.4 Watertight Timer Reset Panel (BR-550)

See Fig.3.23.

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3.5 Motion Detector (BR-560)

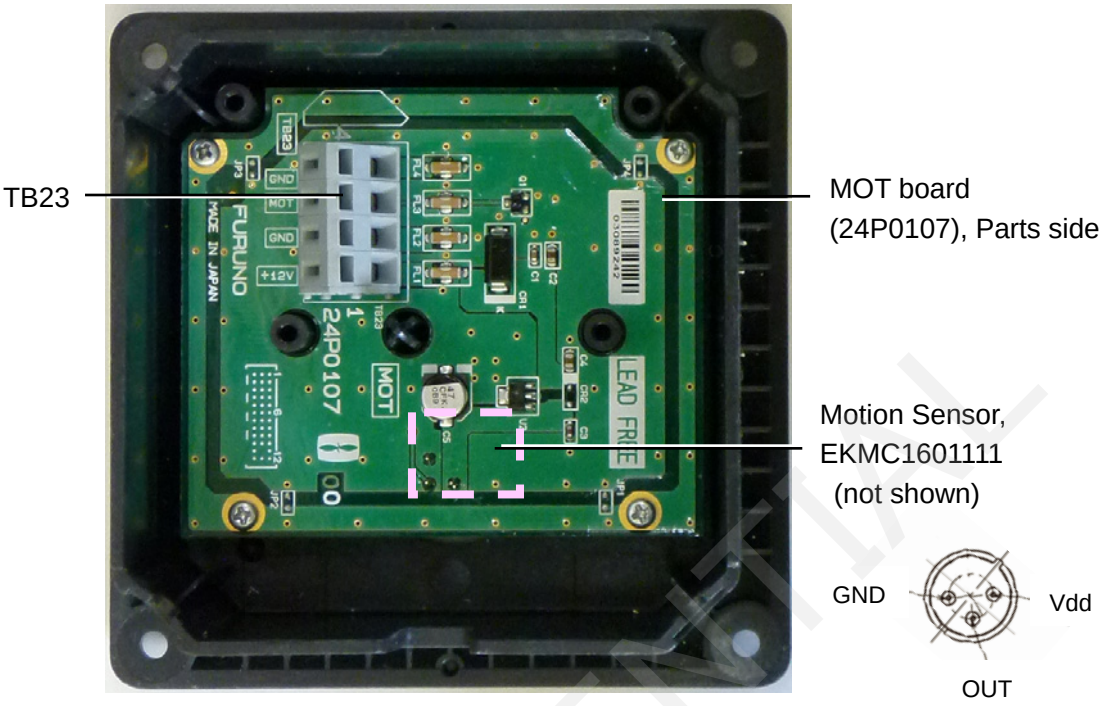

Fig.3.25 Motion Detector, rear view with cover removed

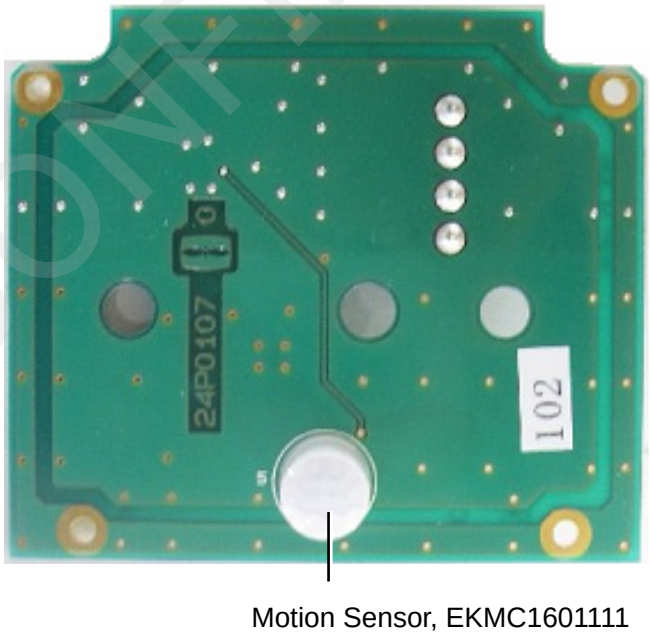

Fig.3.26 MOT board (24P0107), soldering side

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3.6 Flash Beacon (BR-570)

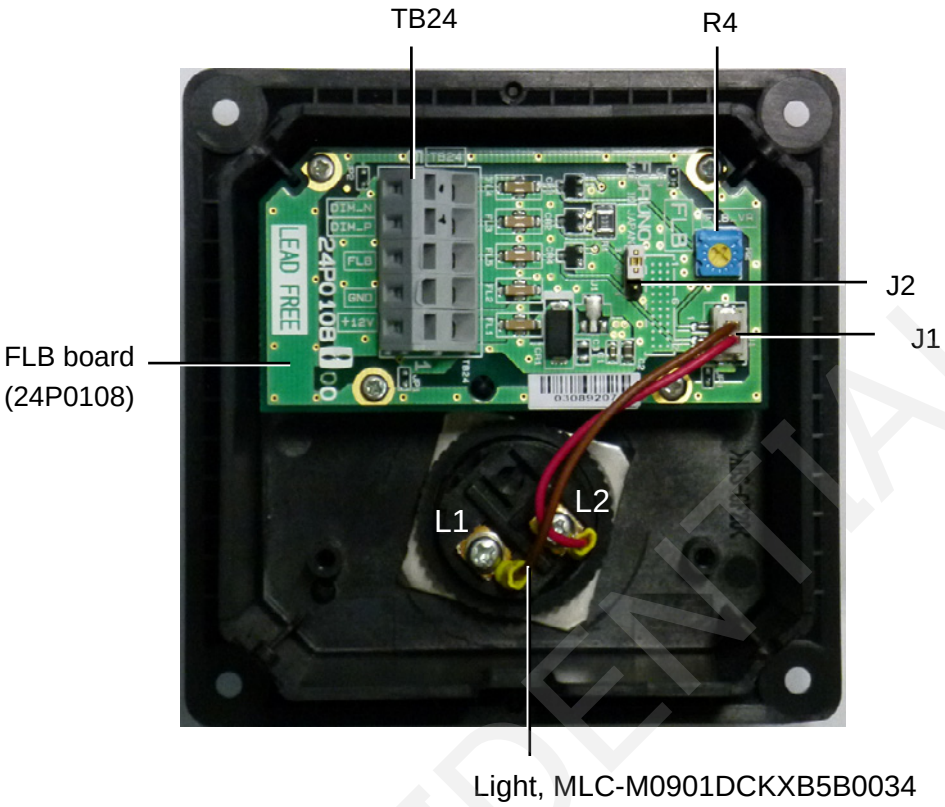

Fig.3.27 Flash Beacon, BR-570 with cover removed

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Chapter 4 Setup

This chapter describes how to setup BR-500.

4.1 Menu

The system is setup through the password-protected Administrator and Service menus.

4.1.1 Password

This system requires a password to open the menu and to change the operation mode.

(1) Password for Administrator

To open the administrator menu and change the operation mode, entering the following password, or making the following keystroke is required. Disclose this password to the master, or captain.

> Up arrow key > Right arrow key > Down arrow key > Left arrow key > ENT/CALL > MENU/ESC

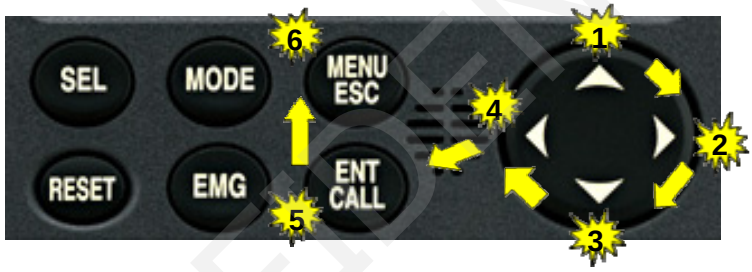

Fig.4.1 Administrator Password

(2) Password for Servicemen

To open the service menu, entering the following password, or making the following keystroke is required. It is not necessary to disclose this password to the master.

> Up arrow key > Down arrow key > Left arrow key > Right arrow key > MENU/ESC > ENT/CALL

Fig.4.2 Serviceman Password

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4.1.2 Administrator menu

Fig.4.3 shows the Administrator menu. To open the menu, use the steps below.

1. Press MENU/ESC key. You are asked to enter the password.
2. Enter the administrator password (Up > Right > Down > Left > ENT > MENU).
3. Use the up or down arrow key to select a menu item, and then press the ENT/CALL key. An options window or spinner box appears depending on your selection.
4. Use the up or down arrow key to select an option or set a value, and then press the ENT/CALL key.

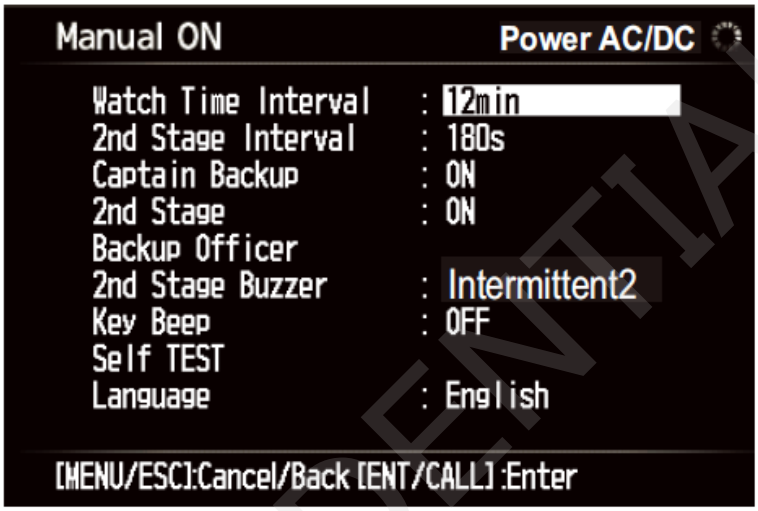

Fig.4.3 Administrator Menu

The following describes the items available under the administrator menu. All factory default values are shown in bold in Table 4.1.

Table 4.1 Description of Administrator menu

Menu Items	Description	Options
Watch Time Interval	Sets the watch time interval (Dormant period)	3 to 12 minutes (**10** min)
2nd Stage Interval	Sets the time interval for the 2nd stage	**90** to 180 seconds
Captain Backup	Selects whether to forward the alarm to the Cabin Panel in the Captain's quarters in the 2nd stage or the 3rd stage.	OFF: Forward in 3rd stage. **ON**: Forward in 2nd stage.
2nd Stage	Selects whether to omit 2nd stage alarm or not.	OFF: Omit alarm. **ON**: Don't omit alarm.

(Cont'd)

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Backup Officer	Changes the function of the cabin panel in the captain cabin (whether the captain is selected as a backup navigation officer or not).	See section 4.3. Backup/**Captain**
2nd Stage Buzzer	Selects a 2nd stage buzzer pattern.	Intermittent1/ **Intermittent2** (See Fig.4.4.)
Key Beep	Turns on/off the key beep.	OFF/**ON**
Self TEST	See Chapter 7.	
Language	Chooses a language.	**English**, Japanese, Chinese, Korean, and Russian.

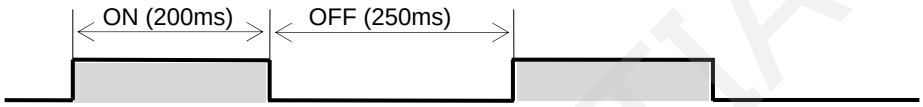

Fig.4.4 (a) Pattern of buzzer, Intermittent 1

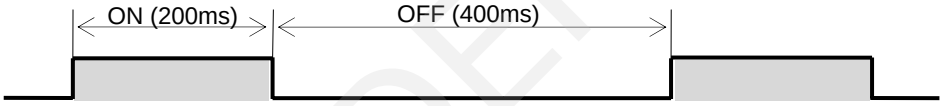

Fig.4.4 (b) Patterns of buzzer, Intermittent 2

4.1.3 Service menu

Fig.4.5 shows the service menu. To open the menu, use the steps below.

1. Press MENU/ESC key. You are asked to enter the password.
2. Enter the servicemen password (Up > Down > Left > Right > ENT > MENU).

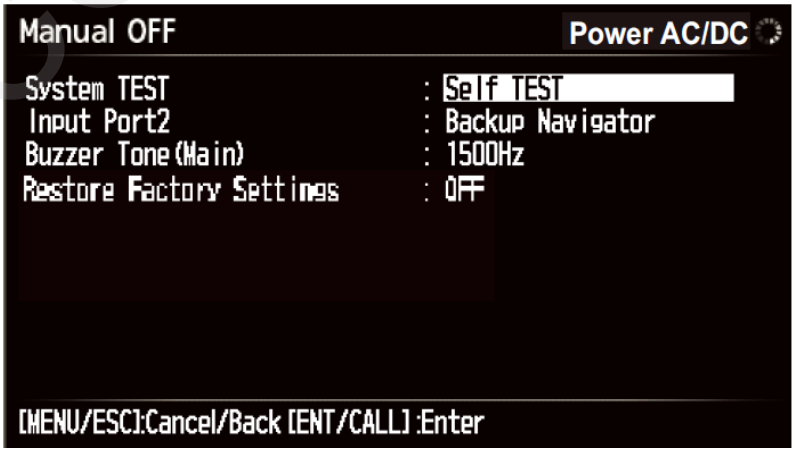

Fig.4.5 Service menu

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Each item in the service menu is setup as below.

1) System TEST
   Used to carry out Self TEST and LCD TEST. The Self TEST checks the system for proper operation. The LCD TEST checks the LCD on the Main Alarm Panel for proper display of colors.
2) Input Port2
   Selects the type of signal to be received at the INPUT2 port: Backup Navigator or Timer Reset signal. (Factory default: Reset signal)
3) Buzzer Tone (Main)
   Sets the frequency of the buzzer in the Main Alarm Panel to 1300 to 1699 (Hz). (Factory default: 1500 Hz)
4) Restore Factory Settings
   Restores all settings back to factory default settings. To do so, use the following procedure.

   1. Select [Restore Factory Settings] by using the cursor pad, and then press the ENT/CALL key.
   2. Select [ON], and then press the ENT/CALL key, and the confirmation menu appears.

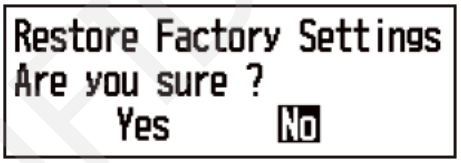

Fig.4.6 Confirmation message

   3. Select "Yes", and then press the ENT/CALL key.
   4. The unit automatically restarts and resets all settings back to original factory settings.

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4.2 Backup Officer Name

The cabin panel in the captain (Master) cabin is connected to TB7 and the cabin panel in the officer cabin is connected to one of terminal boards, TB8 to TB12.

It is recommended to make connections as shown in Table 4.2. If another connection is made, it is necessary to edit the backup officer name.

Table 4.2 Connection of Alarm Panel in Captain and Officer cabins

TB Number	Alarm Panel in	Default Backup Officer Name
TB7	Master cabin	Captain
TB8	Chief officer cabin	C/Officer
TB9	Second officer cabin	2/Officer
TB10	Third officer cabin	3/Officer
TB11	(spare)	Blank
TB12	(spare)	Blank

A) Changing Navigation Officer Name

If the connection of the cabin panel is not the same as Table 4.2, the backup officer name is changed by following the steps below. The name of navigation officer may be changed to the desired one, such as a nickname.

1. Select Backup Officer in the administrator menu.
2. Select the backup officer of which name is changed.

Fig.4.7 Backup officer list

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3. Press the ENT/CALL key and the spinner box appears.

Long pressing the ENT/CALL key deletes all characters in the selected line.

Fig.4.8 Editing Officer Name

4. Use the up or down arrow key to select a character.
5. Use the right or left arrow key to move the cursor over the character to be changed.
6. Repeat steps 4 and 5 to change other characters.
7. Press the ENT/CALL key.

To delete the entire line, press the ENT/CALL key and hold down until the line disappears.

B) Adding another Navigation Officer

Two navigation officers can be added to the lower two lines in the backup officer list.

To add an officer into the list;

1. Select Backup Officer in the administrator menu.
2. Select a blank line (#5 or #6).
3. Press the ENT/CALL key and the spinner box appears.
4. Use the up or down arrow key to select a character.
5. Use the right arrow key to move the cursor for entering another character.
6. Repeat steps 4 and 5.
7. Press the ENT/CALL key when all characters are entered.

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4.3 Master's Cabin Panel

The cabin panel connected to TB7, or the master's cabin panel is setup as one of backup officers. If necessary, change can be made by using the following steps.

4.3.1 Including Captain in Backup Officers

When the captain needs to be selected as a backup officer, setup the BR-500 as below.

1. Open the Administrator menu.
2. Select **Backup Officer**.
3. Select **Captain** and press the ENT/CALL key.
4. Select "Backup" and press the ENT/CALL key.

(Step 3)

Backup: Captain is able to be selected as a backup officer.
Captain: Captain is not able to be selected as a backup officer.

(Step 4)

Fig.4.9 Selecting function of Captain's cabin panel

Now, the captain can be assigned as a backup officer with the SEL key as shown in Fig.4.10.

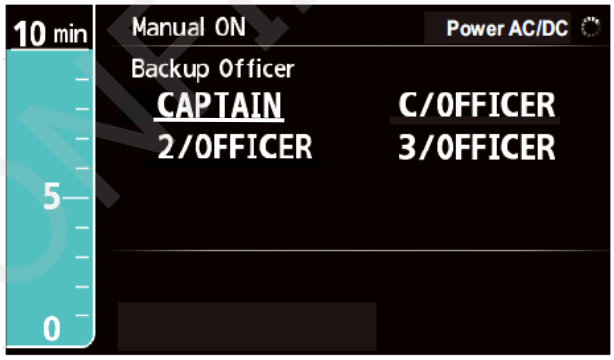

Fig.4.10 Captain being selected as a backup officer

4.3.2 Not Including Captain in Backup Officers

When the captain does not need to be selected as a backup officer, setup the BR-500 as below.

1. Open the Administrator menu.
2. Select **Backup Officer**.
3. Select "**Captain**" and press the ENT/CALL key.

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4. Select "**Captain**" and press the ENT/CALL key.
5. Select **Captain Backup** in the Administrator menu.
6. Select ON or OFF so that either the second stage and the third stage alarms or the third stage alarm is transferred to the cabin panel in the captain's cabin.

   ON: The second stage and third stage alarms are forwarded.

   OFF: The third stage alarm is forwarded. (Factory default)

Now, the CAPTAIN in the backup officer display is preceded by a lower-case "c" in reverse video as shown in Fig.4.11 and the cabin panel in the captain's cabin cannot be selected as a backup officer.

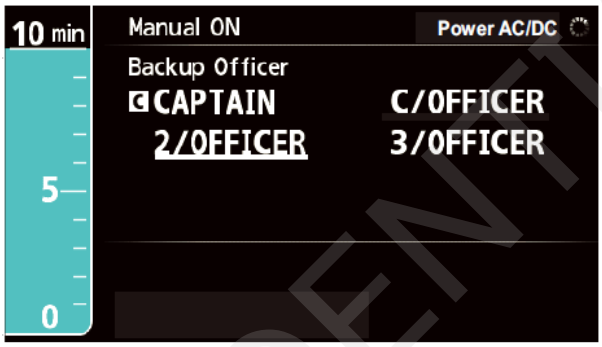

Fig.4.11 Captain not being included in backup officer

4.4 Buzzer Frequency

The buzzer frequency can be changed as shown in Table 4.3.

Table 4.3 Changing buzzer frequency

Buzzer in	How to change buzzer frequency
Main Alarm Panel (BR-510)	Buzzer Tone (Main) in Service menu (1300 to 1699 Hz), Default: 1500 Hz
Cabin Panel (BR-540)	SW2 on MAIN board in Processor unit 4.2 kHz (0, 3 to F), 4.15 kHz (1), and 4.25 kHz (2), Default: 4.2 kHz (0)

4.5 Brilliance of LED and Light

The brilliance of the LEDs on the BR-540 cabin panel and the light on the BR-570 flash beacon is preset with the potentiometer as shown in Table 4.4.

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Table 4.4 Preset of Brilliance

Unit	LED/Light	Adjuster
BR-540	Alarm LED	R2 on CNT board
	Reset/Duty LED	R4 on CNT board
BR-570	Light	R2 on FLB board

4.6 Potentiometers

The potentiometers are used as below.

4.6.1 Processor Unit (BR-520)

The output voltage from the power supply (AC/DC converter), ZWS100BAF-24/FUR is adjusted by VR51.

Table 4.5 VR51 on ZWS100BAF-24/FUR

Power Supply (ZWS100BAF-24/FUR)			
Parts No.	Name	Ratings	Measured across
VR51	Output voltage	25.5V±0.2Vdc	#1 and #8 of CN51

4.6.2 Timer Reset Panel (BR-530) and Cabin Panel (BR-540)

R2 and R4 on the CNT board are used to adjust the brilliance of Alarm and Reset/Duty LEDs respectively.

Table 4.6 R2/R3 on CNT board

CNT board (24P0106/A) – BR-530/540/550			
Parts No.	Name	Factory Setting	Remarks
R2	Alarm LED	Fully clockwise *	Clockwise to increase
R3	Reset/Duty LED	Fully clockwise	

*: BR-530: Fully counter clockwise

4.6.3 Flash Beacon (BR-570)

The brilliance of the flash beacon is preset by R2 on the FLB board, 24P0108 when the optional dimmer is not used.

Table 4.7 R3 on FLB board

FLB board (24P0108) – BR-570			
Parts No.	Name	Factory Setting	Remarks
R2	Alarm LED	Fully clockwise	Clockwise to increase

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4.7 Jumpers

No jumper change is necessary except for when the optional dimmer is connected to the flash beacon, BR-570.

4.7.1 Processor Unit (BR-520)

Jumper J7 in the MAIN board is used to connect and disconnect the terminating resistor located across the receiver input terminals. If necessary, disconnect the resistor by placing the jumper on pins #2-#3.

Table 4.8 J7 on MAIN board

MAIN board (24P0104) – BR-520		
Parts No.	Name	Remarks
J7	Terminator	#1 and #2: Terminator is connected. (Default setting) #2 and #3: Terminator is disconnected.

4.7.2 Timer Reset Panel (BR-530) and Cabin Panel (BR-540)

Jumper J2 on the CNT board, 24P0106/A selects the resistor (0 ohm or 100 ohms) to adjust the sound pressure level of the buzzer: placing the jumper on pins #1-#2 selects 0-ohm resistor and pins #3-#4 100-ohm resistor. Use this jumper in the factory default position.

Table 4.9 J2 on CNT board

CNT board (24P0106/A) – BR-530/540/550		
Parts No.	Name	Remarks
J2	Volume	#1 and#2: 0 ohm; #3 and #4: 100 ohms

4.7.3 Flash Beacon (BR-570)

When the external 3k-ohm dimmer (optional) is connected to the BR-570, change the jumper plug from pins #2-#3 to pins #1-#2.

Table 4.10 J2 on FLB board

FLB board (24P0108) – BR-570		
Parts No.	Name	Remarks
J2	Dimmer selection	#1 and #2: When using external dimmer. #2 and #3: When not using external dimmer. (Factory default)

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4.8 Switches

The switches on the MAIN board, 24P0104 in the Processor unit, BR-510 are used as below.

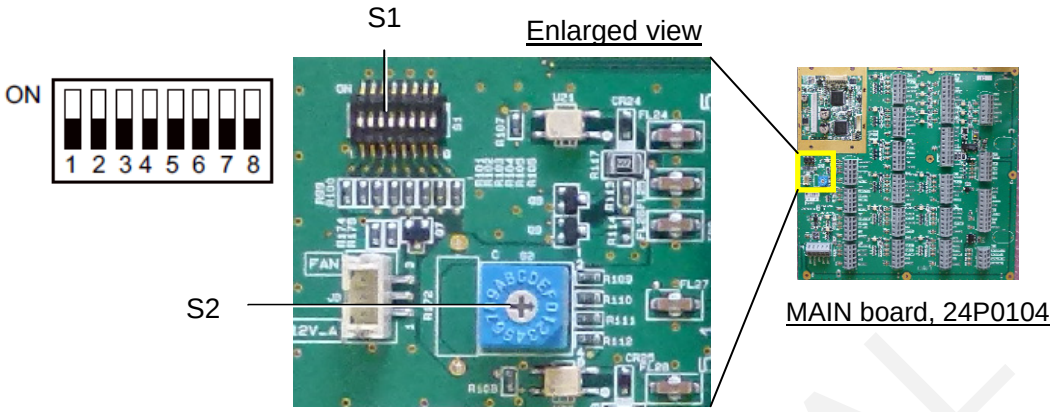

Fig.4.12 Switches on MAIN board (24P0104)

4.8.1 DIP Switch (S1)

Table 4.11 shows the function of the DIP switch, S1. The factory default settings are all OFF.

Table 4.11 Function of S1

#	Function	OFF	ON	Remarks
1	Program overwrite	**Enable**	Disable	Used when updating software
2	I/O test	**Disable**	Enable	
3	ALR output interval	**30s**	60s	
4	Function of flash beacon at 2nd & 3rd stages	**Blink**	Off	
5	Startup mode of processor unit	**Normal**	R&D	R&D use only
6	IEC 61162 Baud rate (bps)	**4800**	38400	
7	Output of the second stage alarm from TB13/TB14/TB15	**No**	Yes	See Note.
8	Not used			

Note: This switch works in BR-520 MAIN program 2450060-01.06 and later.

4.8.2 Rotary Switch (S2)

The frequency of the buzzer on the main alarm panel is adjusted with the rotary switch, S2 on the MAIN board, 24P0104 as shown in Table 4.12. (Factory default in bold)

Table 4.12 Function of S2

Switch position	**0**	1	2	3 to F
Buzzer Frequency	**4.2 kHz**	4.15 kHz	4.25 kHz	4.2 kHz

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Chapter 5 Maintenance

Software update procedure is explained in this chapter. The function of LED and test points is also explained.

5.1 Programs for BR-500

Table 5.1 lists programs for BR-500. The program for the Complex Programmable Logic Device (CPLD) is installed and upgraded only at the factory.

Note) The vessel Japanese flag/JG (Japanese Government) class should equipped with BR-520 of which CPLD program is V01.02 or later. The V01.01 CPLD program cannot adjust the brilliance of the Alarm LED on the timer reset panel and the LED on the flash beacon from the main alarm panel (through BRILL window).

Table 5.1 Programs for BR-500 (as of November 2011)

Unit	Program name	Program number	Remarks
BR-510	Boot	2450054-01.05	When shipped as BR-510: #000431 and after When shipped as BR-500: #500876 and after
	MAIN (CPU)	2450056-01.10	
BR-520	Boot	2450058-01.02	#6423-0916 and after
	MAIN (CPU)	2450060-01.05 *2	
	CPLD*1	2450065-01.02	

*1: Installed and upgraded only at factory

*2: From December 2011, BR-520 MAIN program is updated to V01.06. This program allows the cabin panel in public space to select the alarm: the second or third stage with #7 of S1 on the MAIN board.

5.2 Reading Program Number

The Self Test in the Administrator and Service Menus shows the program numbers. Before and after upgrading the system, check the program versions by using the following procedure.

1. Press MENU/ESC key and “Enter Password” appears.
2. Enter the password (press ▲, ►, ▼, ◄, ENT/CALL and then MENU/ESC).
3. Select Self TEST.
4. Press MENU/ESC key three times to return to the normal display.

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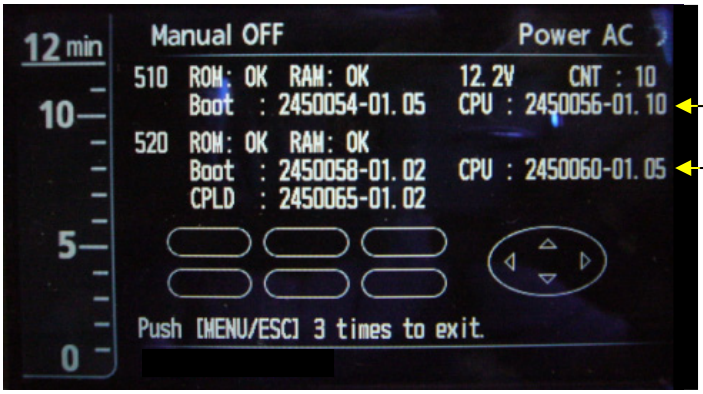

Fig.5.1 Program numbers in Self TEST display

5.3 Updating Program

This section describes how to update the Main Alarm Panel (BR-510) and Processor unit (BR-520).

Note:

1) Edit the two batch files (those with the “bat” extension) to use the COM port number appropriate for your PC.
2) Use BR-510 and BR-520 in a combination of the latest program version. If not, some features may not work.
3) The MAIN and Boot programs are updated in no particular order.
4) Make sure that the power does not go OFF during upgrading. If the power is off, update the system again.
5) The time needed to upgrade each program is;

Program Name	Necessary Time
BR-510 MAIN (CPU)	about 6 minutes
BR-510 Boot	about 2 minutes
BR-520 MAIN (CPU)	about 2 minutes
BR-520 Boot	about 1 minute

5.3.1 Preparation

To update the BR-500, following things are necessary.

1) Update programs for BR-510 and BR-520
2) 1 x PC (Windows XP or Windows 7 32 bit version)
3) 1 x USB to RS-422/RS-485 converter (e.g. ADLINK ND-6530)
4) 1 x Cable with a 6-pin MJ connector
5) 1 x 2-pair signal cable

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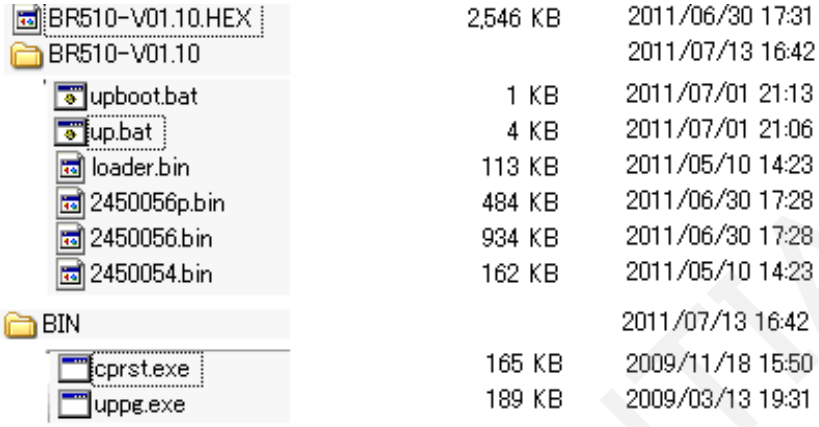
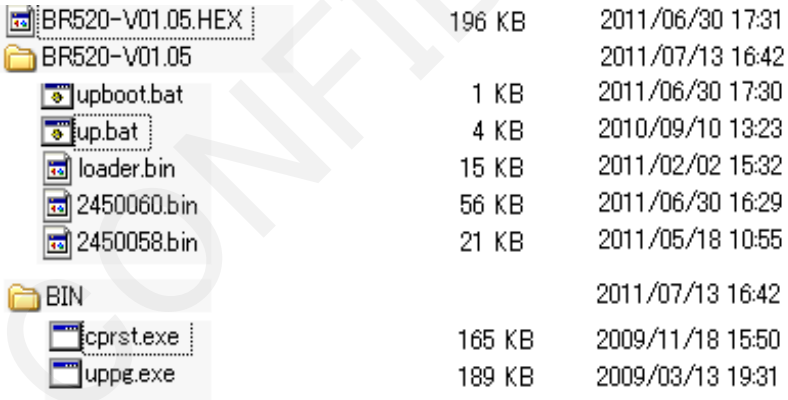
5.3.2 Program Files

The latest program is supplied in the ZIP folder of which file structure is as below. The file size varies according to the program version.

1) Program ZIP folder for BR-510
(Example: 2450054-0105 2450056-0110.zip)



2) Program ZIP folder for BR-520
(Example: 2450058-0102 2450060-0105.zip)



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5.3.3 Editing Batch File

It is assumed that the USB to RS-422/RS-485 converter is connected to COM 1 port. If you need to use a serial port other than COM1, you can edit the batch file using notepad or any other text editor. Each program includes two batch files: up.bat and upboot.bat.

To edit the batch file;

1. Right click the batch file and select Edit.
2. Change the port number.
   (a) up.bat for BR-510 and BR-520
   Change the number in the DPORT line.

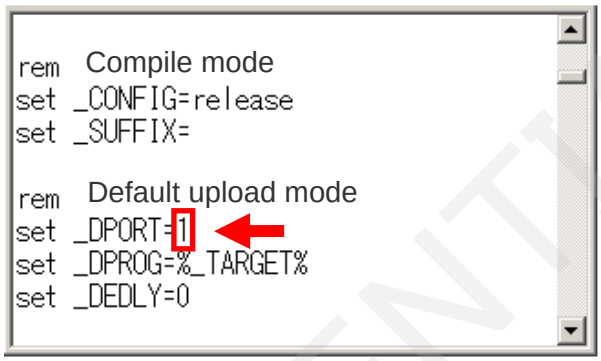

Fig.5.2 Text in up batch file

   (b) BR-510 upboot.bat
   Change the number followed by a colon.

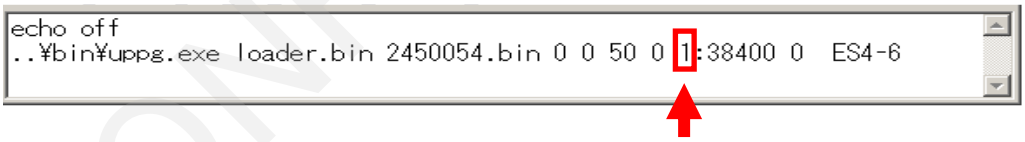

Fig.5.3 Text in BR-510 up.boot.bat file

   (c) BR-520 upboot.bat
   Change the number followed by a colon.

Fig.5.4 Text in BR-520 upboot.bat file

3. Save the edited text.

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5.3.4 Installing USB Driver

This section describes how to install the Adlink 6530 Driver. If you use the converter of another type, follow the instructions in the manual which comes with the converter.

To installing the Adlink 6530 Driver;

1. Take the 'ADLINK All in One CD' and insert it into the CD-ROM drive.
2. An Installation Screen should come up giving you some options. Click on 'Exit' to get out of the Installation Screen.
3. Right click on the 'Start' button.
4. Click on Explore.
5. On the left side of the window, click on the Adlink CD (50-30007-0080).

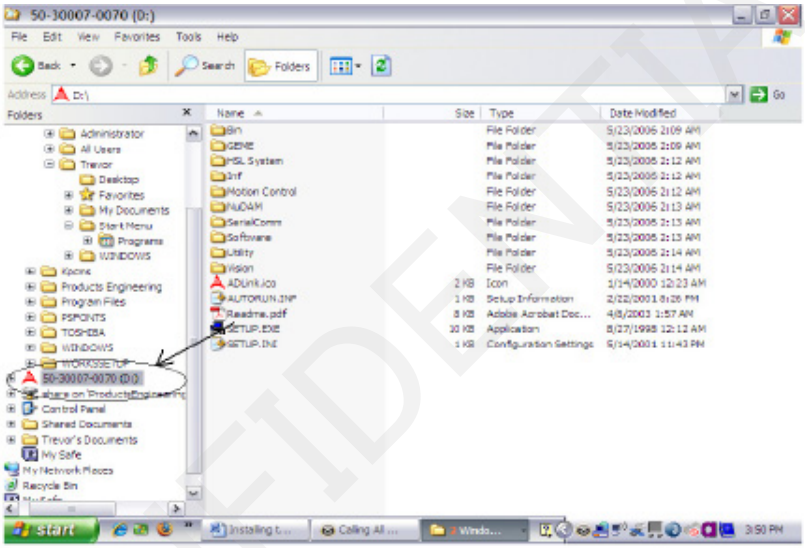

Fig.5.5 Selecting 50-30007-0080

6. Double click on the **NuDAM** folder on the right side of the window.

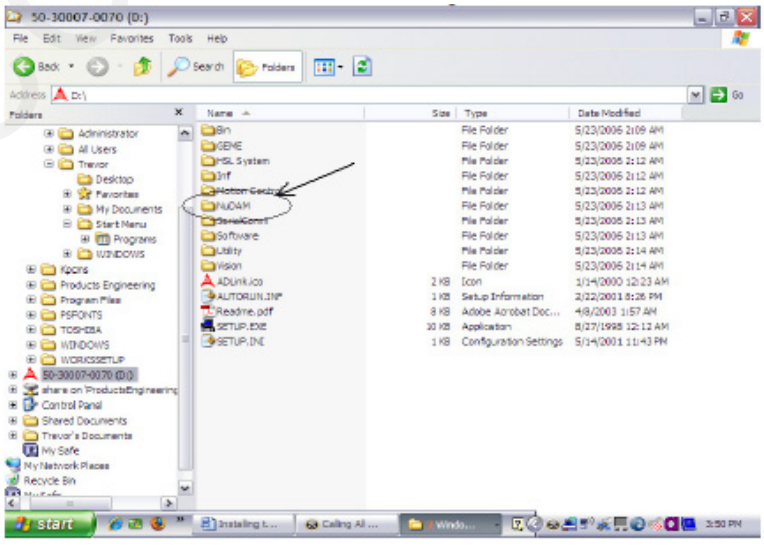

Fig.5.6 Double clicking NuDAM

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7. Double click on the **ND6530** folder.

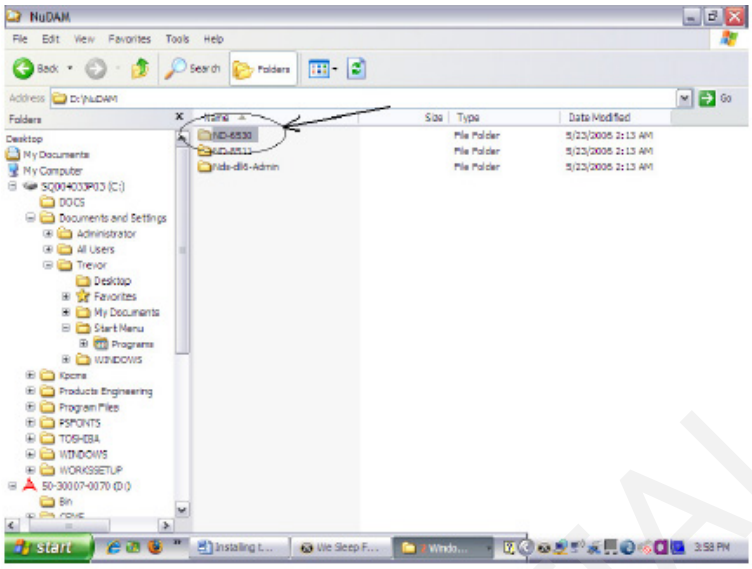

Fig.5.7 Double clicking ND6530

8. Double click on whatever operating system you use. Win2KXP is for Windows 2000 and XP operating systems. Win2KXP is used in this example.

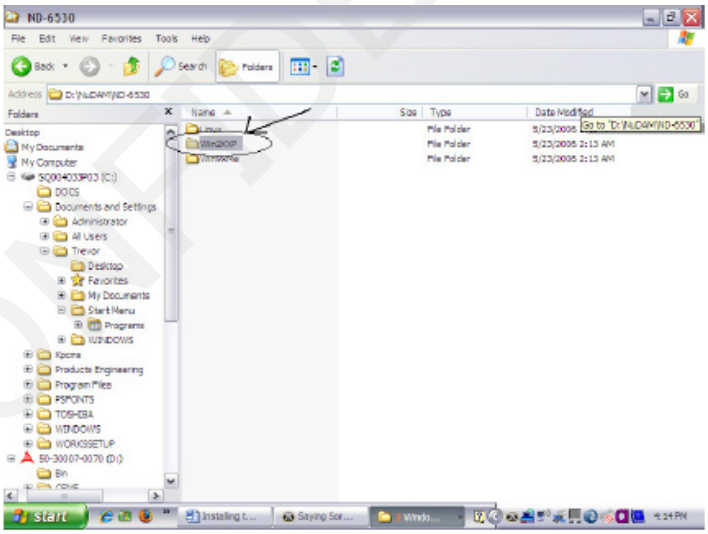

Fig.5.8 Selecting OS (Windows XP)

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9. Double click on the '**Setup.exe**' application to install the driver.

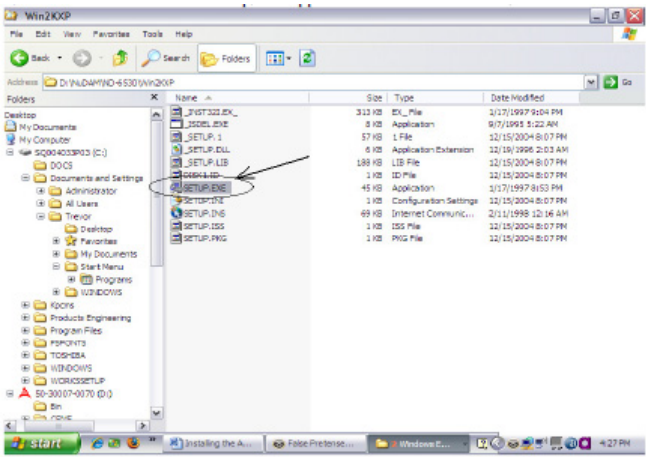

Fig.5.9 Double clicking Setup.exe

10. A Setup Screen will appear. Click on '**Next**'.

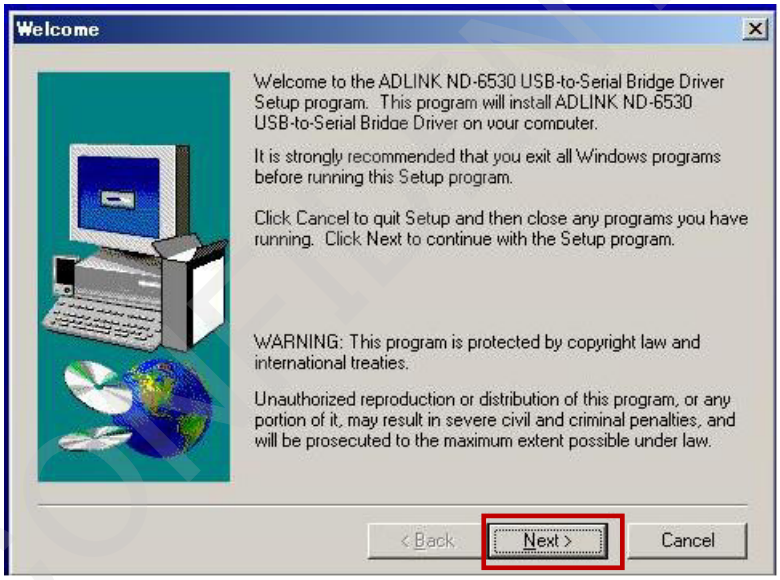
Welcome
Welcome to the ADLINK ND-6530 USB-to-Serial Bridge Driver Setup program. This program will install ADLINK ND-6530 USB-to-Serial Bridge Driver on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
< Back
Next >
Cancel

Fig.5.10 Setup Screen

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11. Enter your name and company name in the spaces provided.

12. Click on the '**Next**' button when you have completed this.

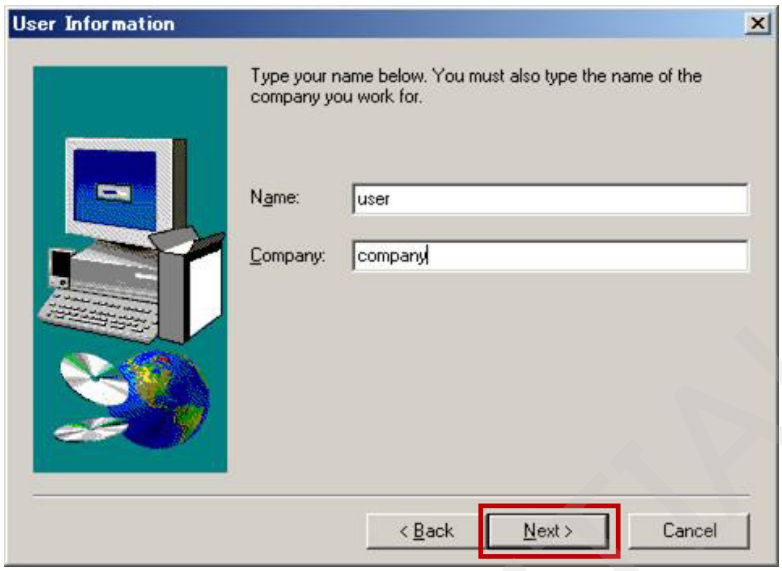

Fig.5.11 User Information display

13. Click **Next** on the Choose Destination Location screen, Fig.5.12.

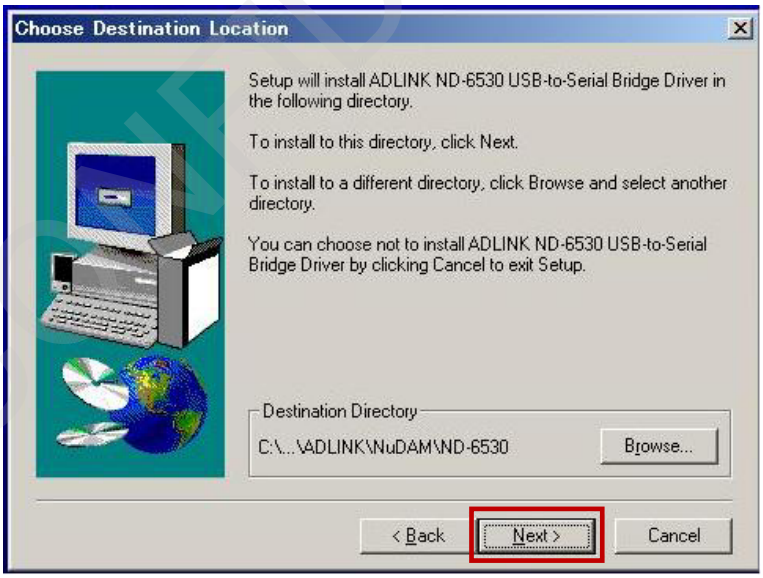
Choose Destination Location
Setup will install ADLINK ND-6530 USB-to-Serial Bridge Driver in the following directory.
To install to this directory, click Next.
To install to a different directory, click Browse and select another directory.
You can choose not to install ADLINK ND-6530 USB-to-Serial Bridge Driver by clicking Cancel to exit Setup.
Destination Directory
C:\...\ADLINK\NuDAM\ND-6530
Browse...
< Back
Next >
Cancel

Fig.5.12 Choose Destination Location

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14. Click **Next** on the Select Program Folder screen, Fig.5.13.

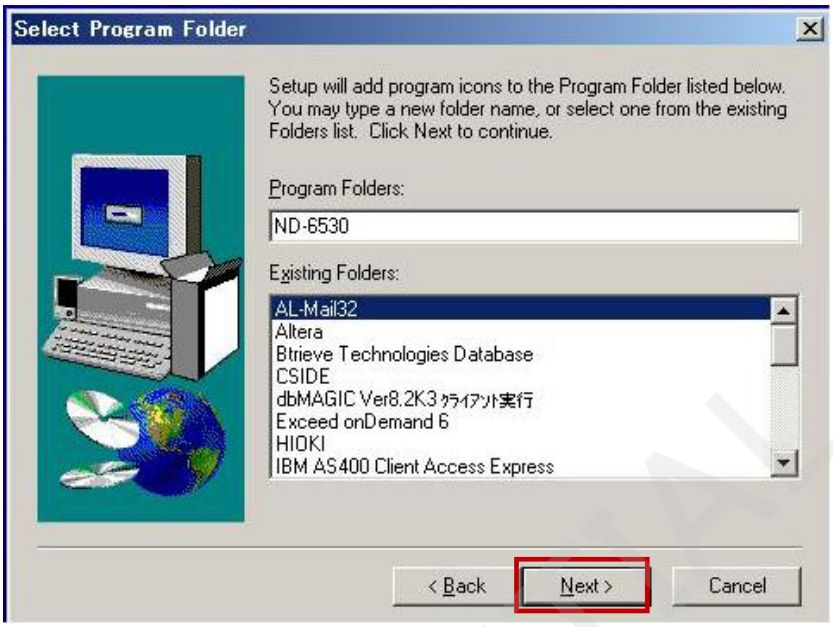
Select Program Folder
Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing Folders list. Click Next to continue.
Program Folders:
ND-6530
Existing Folders:
AL-Mail32
Altera
Btrieve Technologies Database
CSIDE
dbMAGIC Ver8.2K3 ｸﾗｲｱﾝﾄ実行
Exceed onDemand 6
HIOKI
IBM AS400 Client Access Express
< Back
Next >
Cancel

Fig.5.13 Select Program Folder screen

15. Click **Next** on the Start Copying Files screen, Fig.5.14.

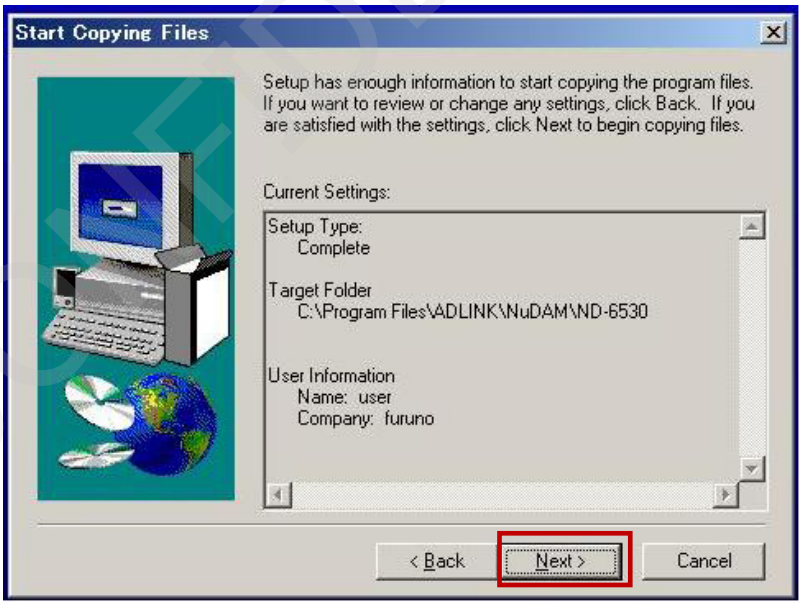
Start Copying Files
Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files.
Current Settings:
Setup Type:
Complete
Target Folder
C:\Program Files\ADLINK\NuDAM\ND-6530
User Information
Name: user
Company: furuno
< Back
Next >
Cancel

Fig.5.14 Start Copying Files screen

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16. Select "**Yes, I want to restart my computer now.**" and click **Finish** on the Setup Complete screen.

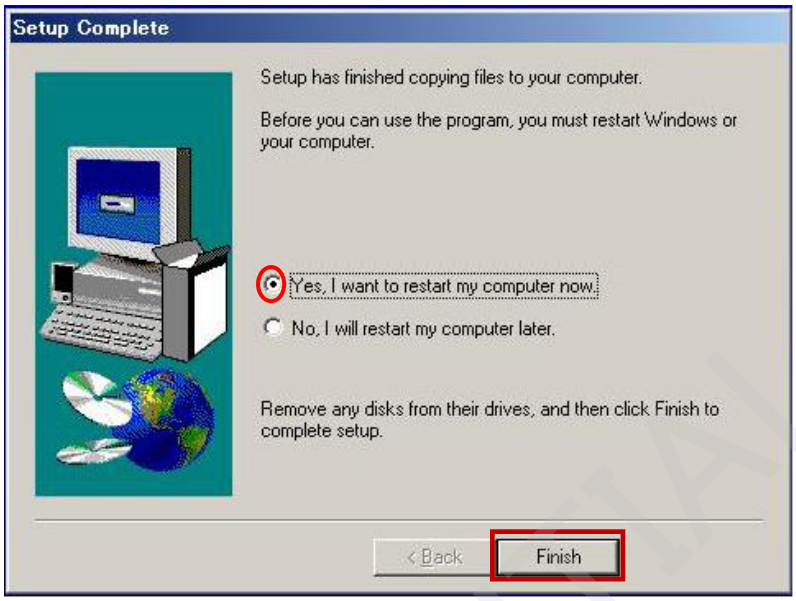
Setup Complete
Setup has finished copying files to your computer.
Before you can use the program, you must restart Windows or your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish

Fig.5.15 Setup Complete screen

17. NOW CONNECT THE ND6530 TO the USB port on the PC and wait until the following wizard window appears on the PC. Select **No, not this time** and then click **Next**.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Fig.5.16 Found New Hardware Wizard

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18. Select "**Install the software automatically [Recommended]**" and click **Next**.

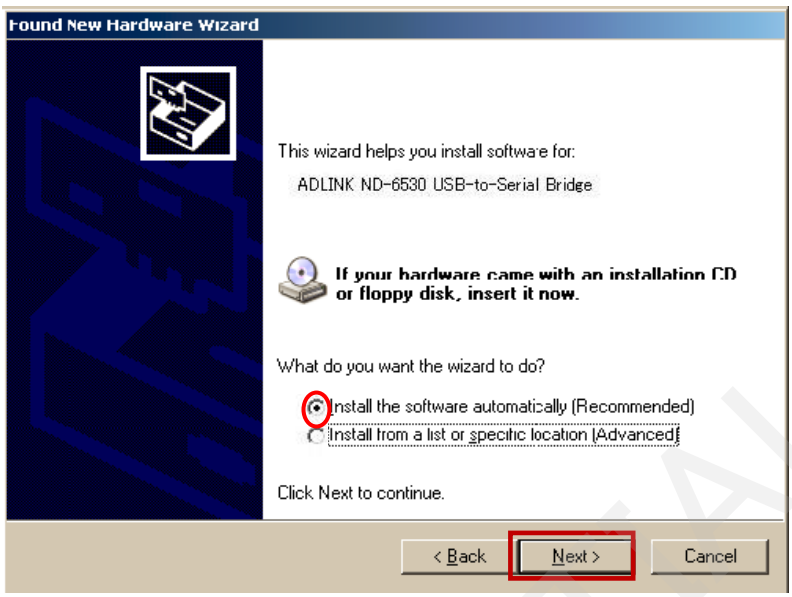
Found New Hardware Wizard
This wizard helps you install software for:
ADLINK ND-6530 USB-to-Serial Bridge
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Fig.5.17

19. When the following window appears, click **Continue Anyway**.

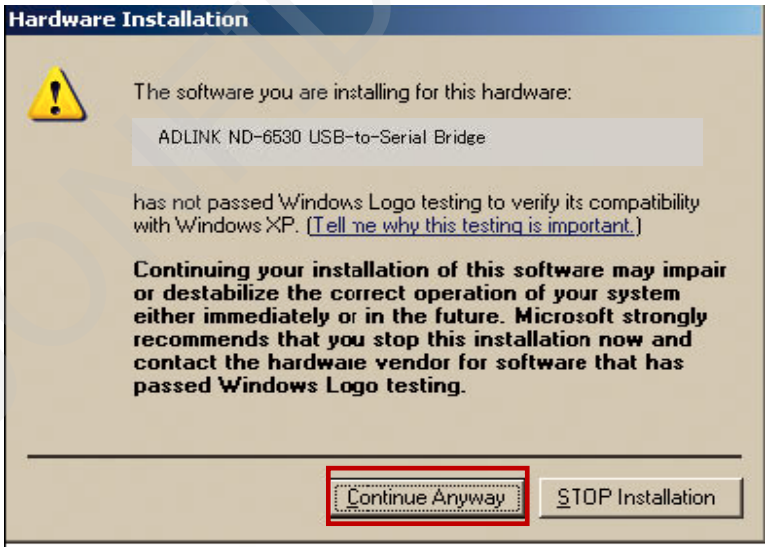
Hardware Installation
The software you are installing for this hardware:
ADLINK ND-6530 USB-to-Serial Bridge
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Fig.5.18

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20. Wait until software installation is complete and click **Finish**.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
ADLINK ND-6530 USB-to-Serial Bridge
Click Finish to close the wizard.
< Back
Finish
Cancel

Fig.5.19

21. Right-click the My Computer icon, select **Properties**. When the system properties window appears, select the **Hardware** tab, and then **Device Manager**.

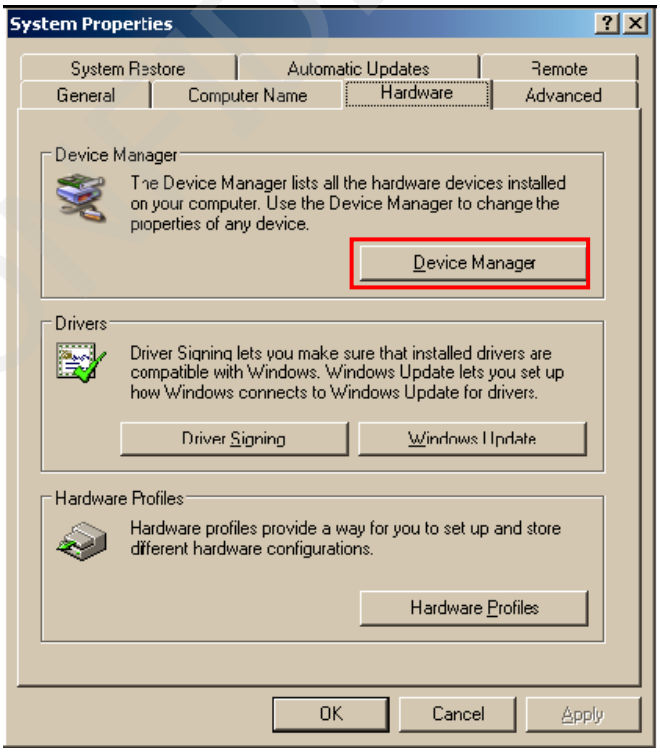
System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

Fig.5.20 System Properties

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22. Click the plus sign in front of "Ports (COM & LPT)" to view your COM port assignments. In the example below, ADLINK ND-6350 USB-to-Serial Bridge (COM7) is assigned to "COM7".

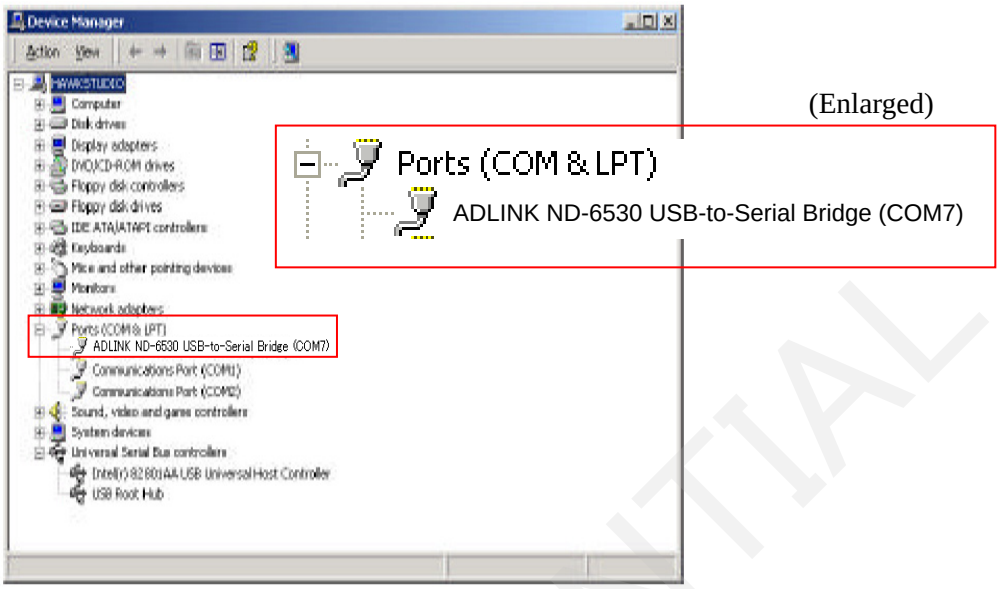

Fig.5.21 Device Manager

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5.3.5 Upgrading BR-510

The BR-510 processor unit uses two programs: Main and Boot. Following describes how to update these programs.

(1) MAIN program of BR-510

To update the BR-510 MAIN program;

1. Copy the program zip folder (2450054-0105.zip) onto a PC.
2. Edit the batch file if necessary. See section 5.3.3.
3. Ensure that the unit is turned off.
4. Connect the PC to the BR-510 via a USB to RS-422/RS-485 converter as shown in Fig.5.22.

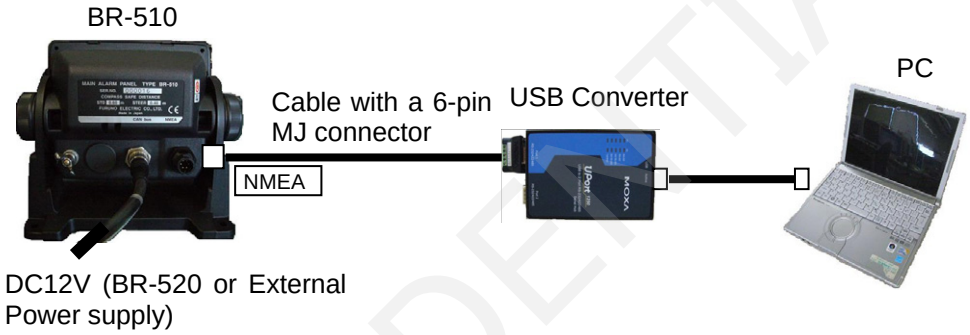

Fig.5.22 Connection of PC to NMEA port on BR-510 via converter

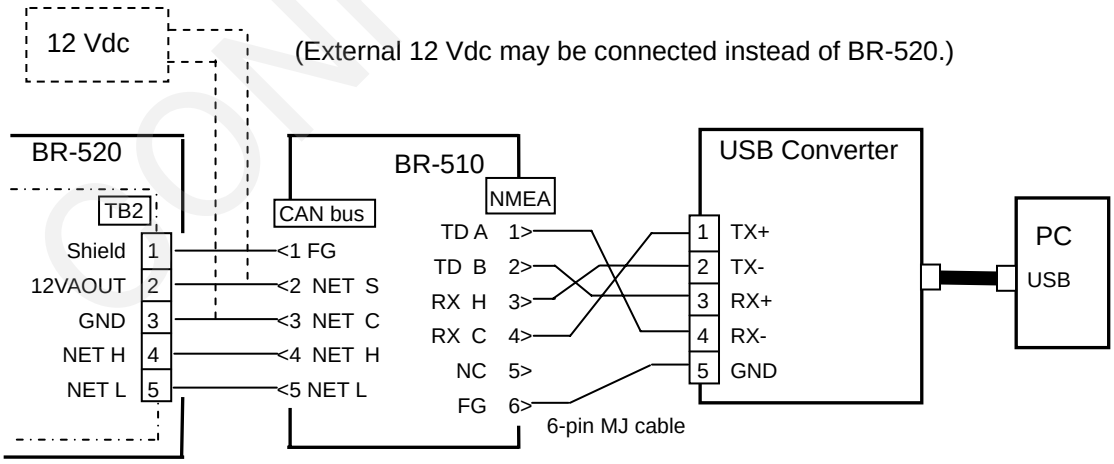

Fig.5.23

5. Double click **up.bat** in the program folder.
6. Wait until TARGET POWER ON message appears. See Fig.5.24.

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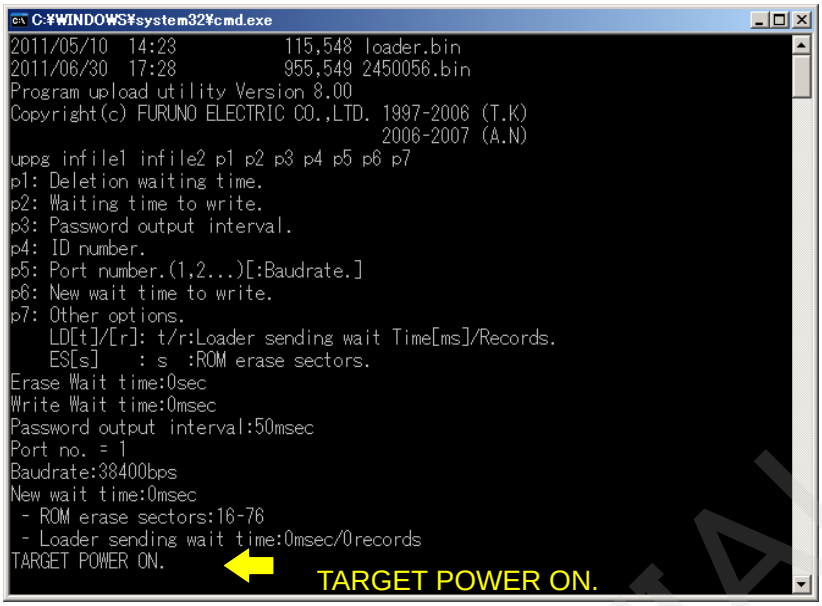
C:¥WINDOWS¥system32¥cmd.exe
2011/05/10 14:23 115,548 loader.bin
2011/06/30 17:28 955,549 2450056.bin
Program upload utility Version 8.00
Copyright(c) FURUNO ELECTRIC CO.,LTD. 1997-2006 (T.K)
2006-2007 (A.N)
uppg infile1 infile2 p1 p2 p3 p4 p5 p6 p7
p1: Deletion waiting time.
p2: Waiting time to write.
p3: Password output interval.
p4: ID number.
p5: Port number.(1,2...)[:Baudrate.]
p6: New wait time to write.
p7: Other options.
LD[t]/[r]: t/r:Loader sending wait Time[ms]/Records.
ES[s] : s :ROM erase sectors.
Erase Wait time:0sec
Write Wait time:0msec
Password output interval:50msec
Port no. = 1
Baudrate:38400bps
New wait time:0msec
- ROM erase sectors:16-76
- Loader sending wait time:0msec/0records
TARGET POWER ON.
TARGET POWER ON.

Fig.5.24

7. Turn on the BR-510.

New program is loaded automatically with the following changes in the display. If the display does not change, reboot the system and upgrade the unit again. If you still have the problem, check the settings on the converter.

Note) Do not turn off the unit during upgrade.

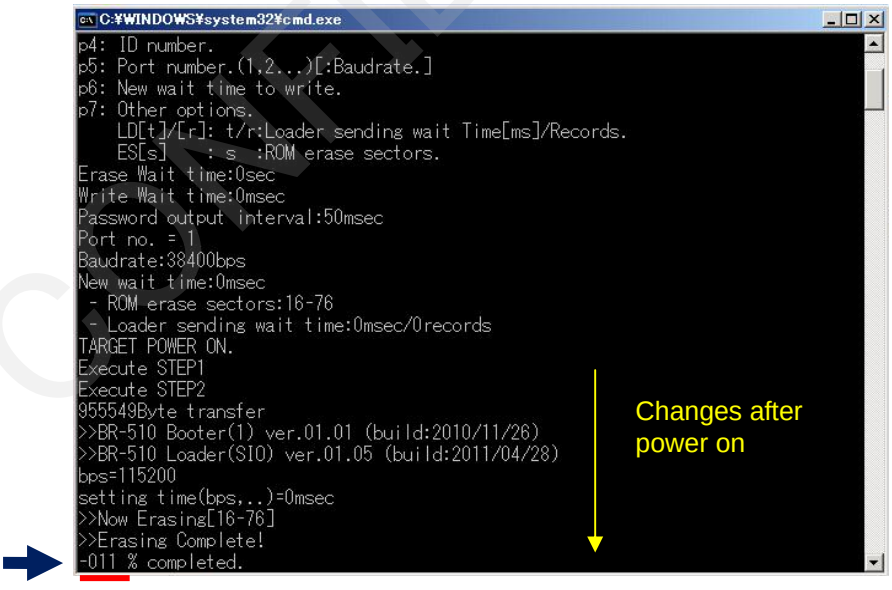

Fig.5.25 Task completion indicator

The progress of task completion is displayed on the bottom line: xx% completed. The Command prompt closes and the BR-510 reboots automatically when the new program is loaded completely.

The next step is to load new Boot program.

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(2) Boot program of BR-510

The BR-510 boot program is updated with the same procedure as the MAIN program.

1. Turn off the BR-510 and check the connections, referring to Fig.5.22.
2. Double click **upboot.bat** in the program folder.
3. Wait until TARGET POWER ON message appears. See Fig.5.26.

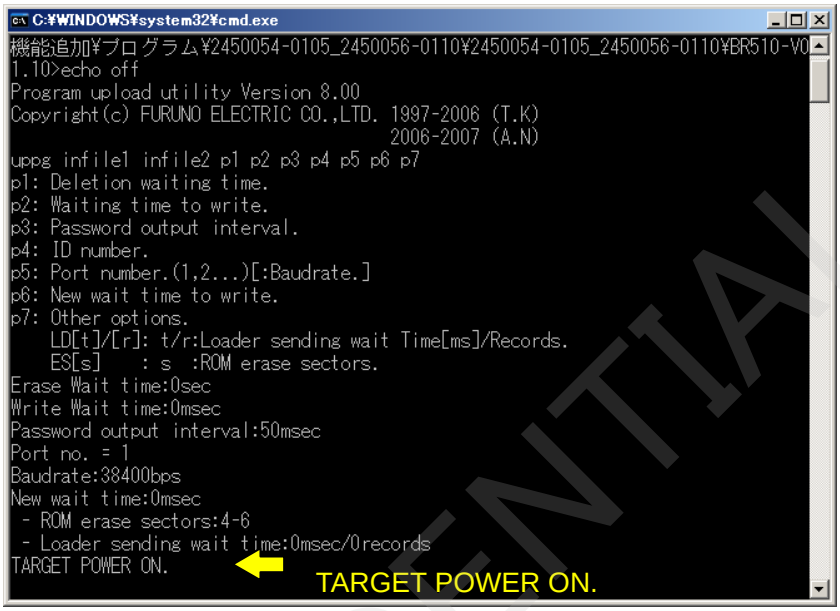

Fig.5.26

4. Turn on the BR-510.

New program is loaded automatically with the following changes in the PC screen.

Note) Do not turn off the unit during upgrade.

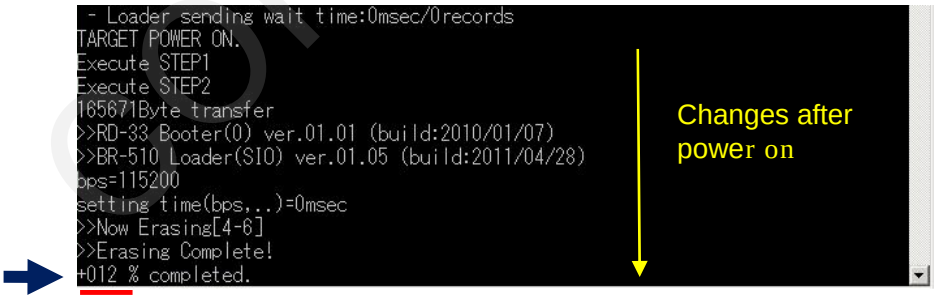

Fig.5.27

The progress of task completion is displayed on the bottom line: xx% completed. The Command prompt closes and the BR-510 reboots automatically when the new program is loaded completely.

5. Carry out the self test to read the program numbers. This step may be done after updating BR-520.

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5.3.6 Upgrading BR-520

The processor unit, BR-520 also uses two programs: Main and Boot. Following describes how to update these programs.

(1) MAIN program of BR-520

To update BR-520 MAIN program;

1. Copy the program zip folder onto a PC.
2. Edit the batch file if necessary.
3. Ensure that the unit is turned off.
4. Connect the PC to TB20 in the BR-510 via a USB to RS-422/RS-485 converter as shown in Fig.5.28.

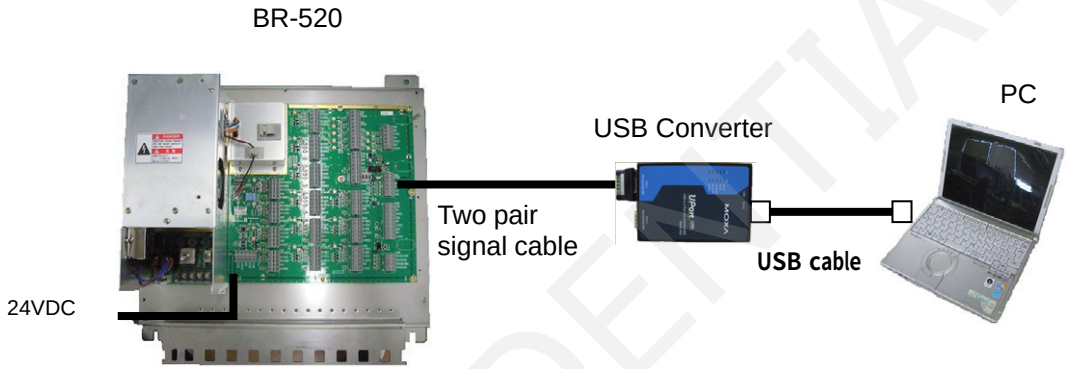

Fig.5.28 Connection of PC to TB-20 in BR-520 via converter

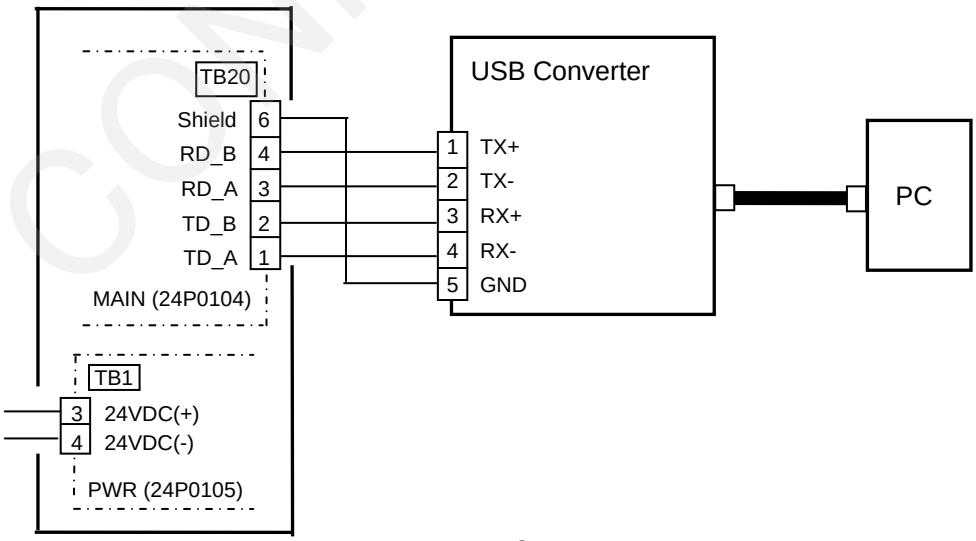

Fig.5.29

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5. Double click **up.bat** in the program folder.
6. Wait until TARGET POWER ON message appears.

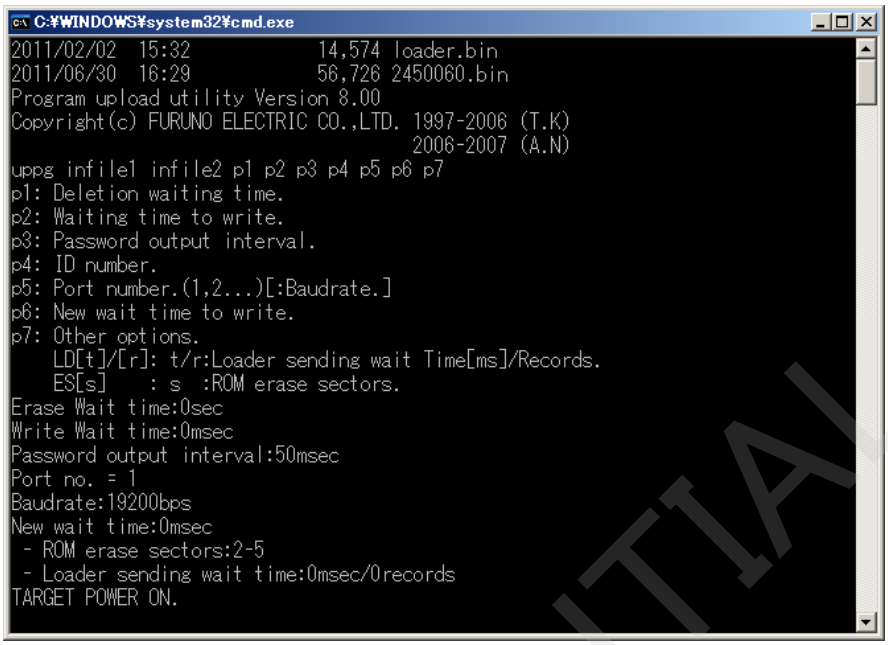
C:¥WINDOWS¥system32¥cmd.exe
2011/02/02 15:32 14,574 loader.bin
2011/06/30 16:29 56,726 2450060.bin
Program upload utility Version 8.00
Copyright(c) FURUNO ELECTRIC CO.,LTD. 1997-2006 (T.K)
2006-2007 (A.N)
uppg infile1 infile2 p1 p2 p3 p4 p5 p6 p7
p1: Deletion waiting time.
p2: Waiting time to write.
p3: Password output interval.
p4: ID number.
p5: Port number.(1,2...)[:Baudrate.]
p6: New wait time to write.
p7: Other options.
LD[t]/[r]: t/r:Loader sending wait Time[ms]/Records.
ES[s] : s :ROM erase sectors.
Erase Wait time:0sec
Write Wait time:0msec
Password output interval:50msec
Port no. = 1
Baudrate:19200bps
New wait time:0msec
- ROM erase sectors:2-5
- Loader sending wait time:0msec/0records
TARGET POWER ON.

Fig.5.30

7. Turn on the BR-520.

New program is loaded automatically with the following display. If the display does not change, reboot the system and upgrade the unit again. If you still have the problem, check the settings on the converter.

Note) Do not turn off the unit during upgrade.

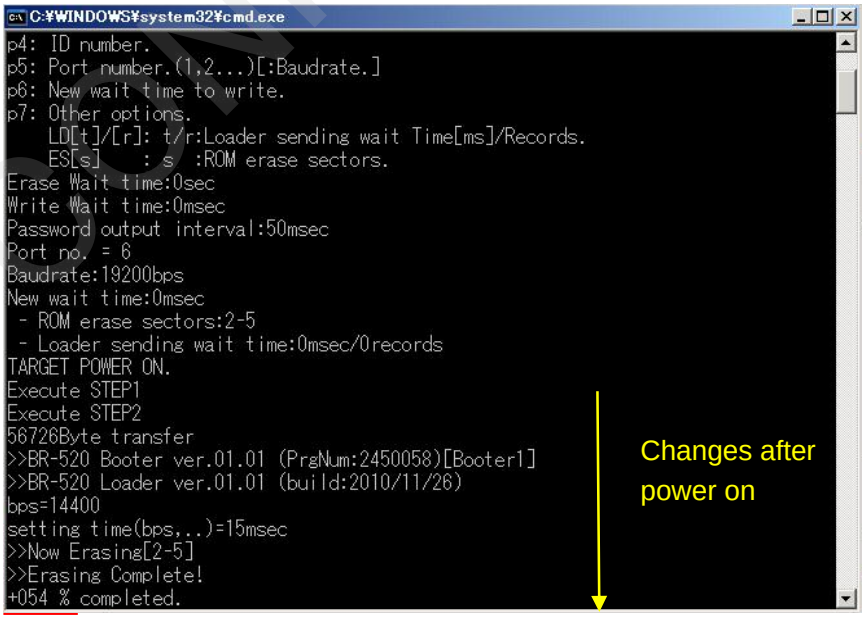

Fig.5.31

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The progress of task completion is displayed on the bottom line: xx% completed. The Command prompt closes and the BR-520 reboots automatically when the new program is loaded completely. The next step is to load new Boot program.

(2) Boot program of BR-520

The BR-510 boot program is updated with the same procedure as the MAIN program.

1. Turn off the BR-510 and check the connections, referring to Fig.5.28.
2. Double click **upboot.bat** in the program folder.
3. Wait until TARGET POWER ON message appears. See Fig.5.32.

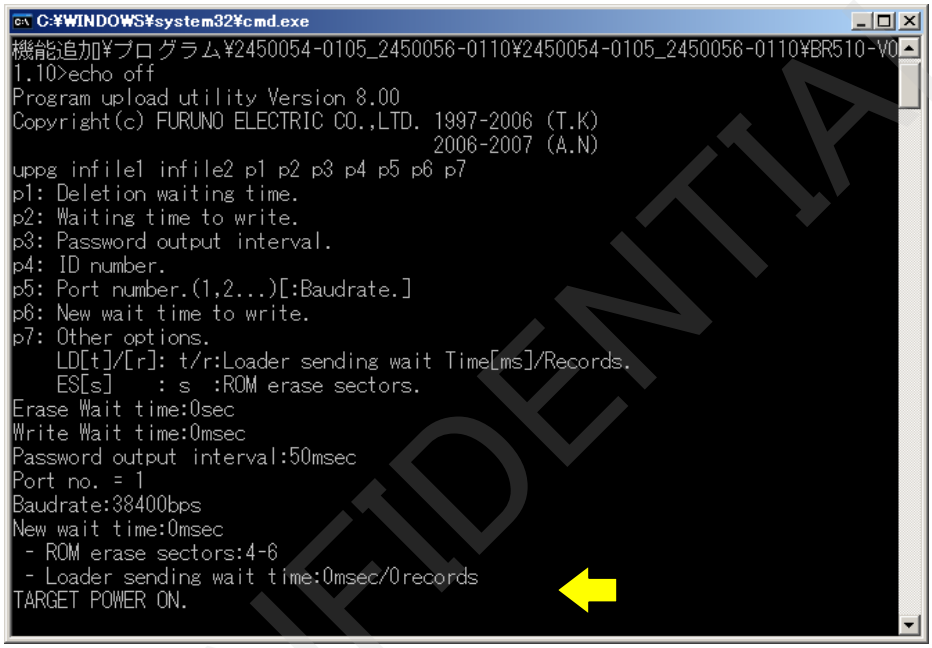

Fig.5.32

4. Turn on the BR-520.

New program is loaded automatically with the following changes in the PC screen.

Note) Do not turn off the unit during upgrade.

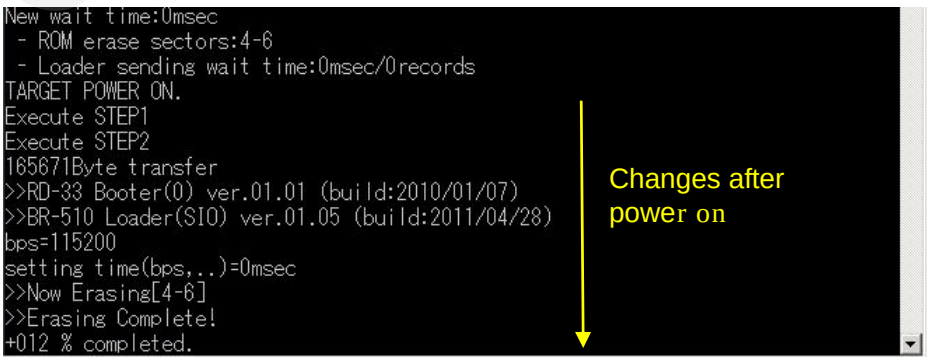

Fig.5.33

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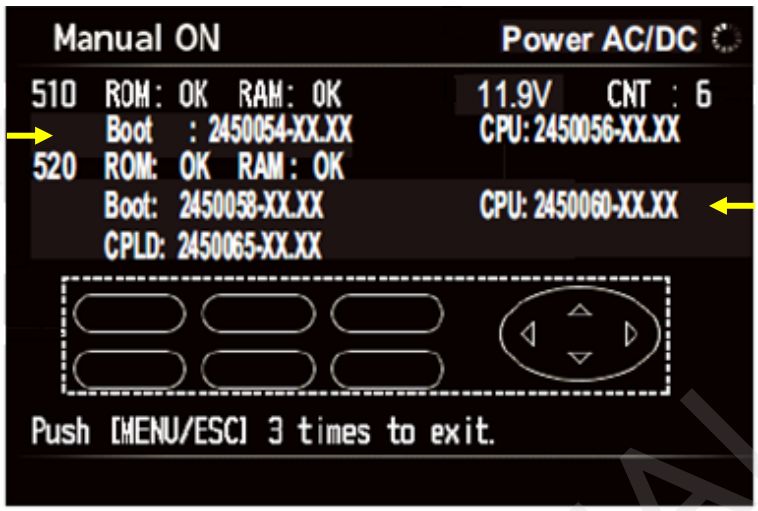
5. Carry out the self test and read program numbers.



BR-510 Boot and CPU (MAIN)

BR-510 Boot, CPU (MAIN), and CPLD

Fig.5.34 Reading program numbers

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5.4 LEDs

The function of the light-emitting diodes (LEDs) is described in this section.

5.4.1 Processor Unit (BR-520)

The LEDs on the MAIN (24P0104) and PWR (24P0105) boards work as described in Tables 5.2 and 5.3 respectively. CR1 to CR4 on the MAIN board light instantaneously at power on. See Table 5.2 (b).

Table 5.2 (a) LEDs on MAIN board (24P0104)

MAIN board (24P0104)			
Partrs No.	Name	Status	Remarks
CR1	CPU TEST4	Off	See table 5.2 (b).
CR2	CPU TEST3	Off	
CR3	CPU TEST2	Off	
CR4	CPU TEST1	Off	
CR5	PLD TEST4	Off	Not used
CR6	PLD TEST3	Off	Not used
CR7	PLD TEST2	Off	Not used
CR8	PLD TEST1	Off	Not used

Table 5.2 (b) CR1 to CR4 on MAIN board

	CR1	CR2	CR3	CR4
Starter program runs normally	Off	Light	Light	Light
Boot program runs normally	Off	Off	Light	Light
Main Program runs normally	Off	Off	Off	Off

Table 5.3 LEDs on PWR board (24P0105)

PWR board (24P0105)			
Parts No.	Name	Status	Condition
CR1	12V_A	Light	12V_A is output normally.
CR2	12V_B	Light	12V_B is output normally.
CR3	5V	Light	5V is output normally.
CR7	DC_PWR	Light	DC supply voltage is input.
CR8	AC_PWR	Light	AC supply voltage is input.

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5.4.2 Timer Reset Panel (BR-530/550)

Two LEDs on the Timer Reset Panel are CR2 and CR3 on the CNT board, 24P0106.

Table 5.4 LEDs on CNT board (24P0106)

CNT board (24P0106) - BR-530/550			
Parts No.	Name	Status	Remarks
CR2	ALARM	Off	Blinks when alarm is generated.
CR3	RESET	Light	Goes off when power is removed.

5.4.3 Cabin Panel (BR-540)

The status of the ALARM LED on the cabin panel in the public cabin depends on the setting of #7 of DIP switch S1 on the MAIN board in the processor unit. When the MAIN program for the BR-520 MAIN board is V01.05 and earlier, the alarm is always sent to the public cabins from the second stage.

Table 5.5 LEDs on CNT board (24P0106A)

CNT board (24P0106A) - BR-540			
Parts No.	Name	Status	Remarks
CR2	ALARM	Off	Lights when the alarm is generated.*2
CR3	DUTY	*1	

*1: The LED in the assigned backup officer and public cabins lights and the LED in other cabins is off.

*2: The alarm is generated according to settings of S2 on the MAIN board (V01.06 and later) and menu.

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5.5 Test Points

Tables 5.6 and 5.7 list the test points on the MAIN (24P0104) and PWR (24P0105) boards in the processor unit respectively. The silk screen text indicates the test point numbers, but no test pin is mounted on the printed circuit board.

Table 5.6 Test points on MAIN board (24P0104)

MAIN board (24P0104)		
Parts No.	Signal Name	Rating
TP1	3.3V	3.0 to 3.6V
TP2	5V	4.85 to 5.15V
TP3	GND	0V
TP4	RESET_N	3.3V
TP5	GND	0V

Table 5.7 Test points on PWR board (24P0105)

PWR board (24P0105)		
Parts No.	Signal Name	Rating
TP1	GND	0V
TP2	12V_B	11.4 to 12.6V
TP3	5V	4.85 to 5.15V
TP4	12V_A	11.4 to 12.6V

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Chapter 6 Replacement of Major Parts

This chapter describes step by step procedure for removing major parts. Note that some parts are not supplied as a maintenance parts.

6.1 Main Alarm Panel (BR-510)

6.1.1 Front Panel

Use a small screwdriver to carefully pry the front panel out. There are eight small indents (two on each side) on the front panel.

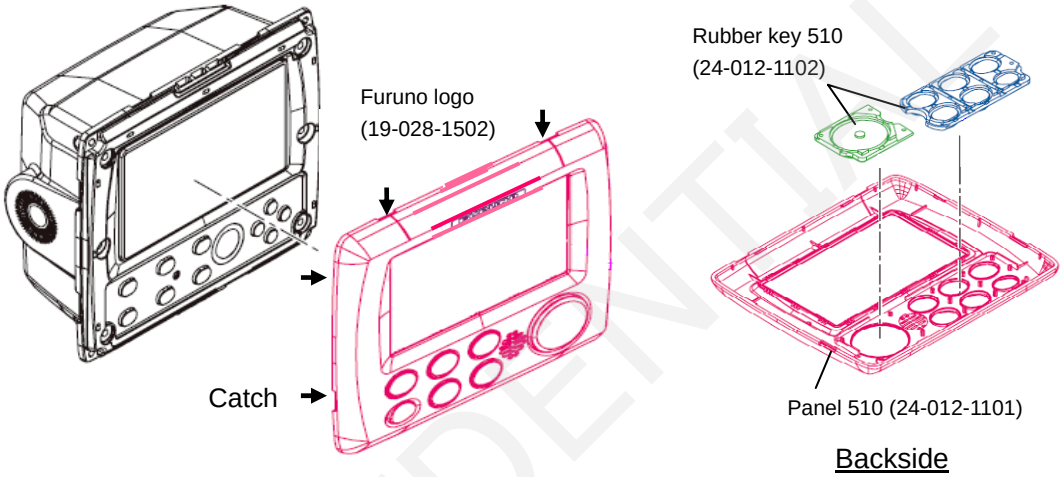

Fig.6.1 Removing Front panel

6.1.2 MAIN board (20P8200B)

To remove the MAIN board, 20P8200B, remove the front panel first, referring to section 6.1.1. Then, follow the steps below.

1. Remove six self-tapping (Delta PT) screws, #1 to #6 shown in Fig.6.2.

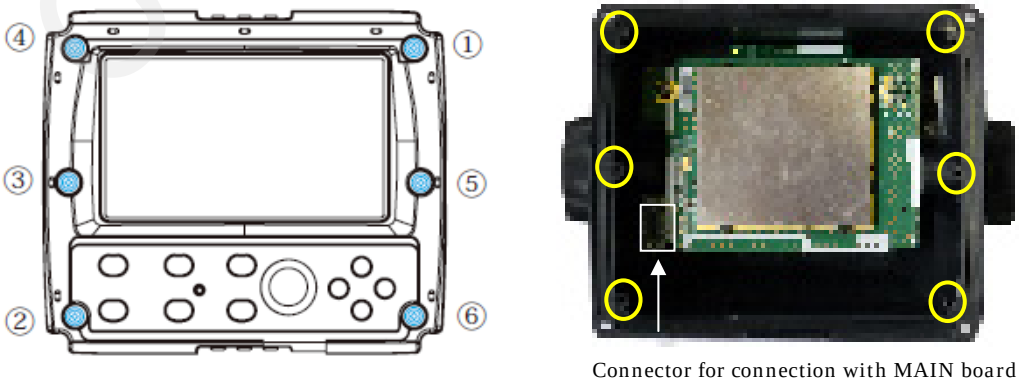

Fig.6.2 Removing screws which fixes Cover (Front) assy.

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NOTE: When assembling the Cover (front) assembly, tighten screws #1 to #6 in the numbered sequence as shown in Fig.6.2.

2. Lift the Cover (Front) assembly straight up. The Cover (Front) assembly with the MAIN board and LCD assembly has a connector connection to the Cover (Rear) assembly with the PWR board as shown in Fig.6.3.

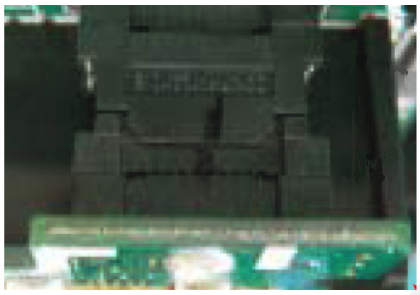

Fig.6.3 Connection between PWB and MAIN boards

3. Disengaging the catches, remove the Plate (FG) from the chassis. See Fig.6.4.

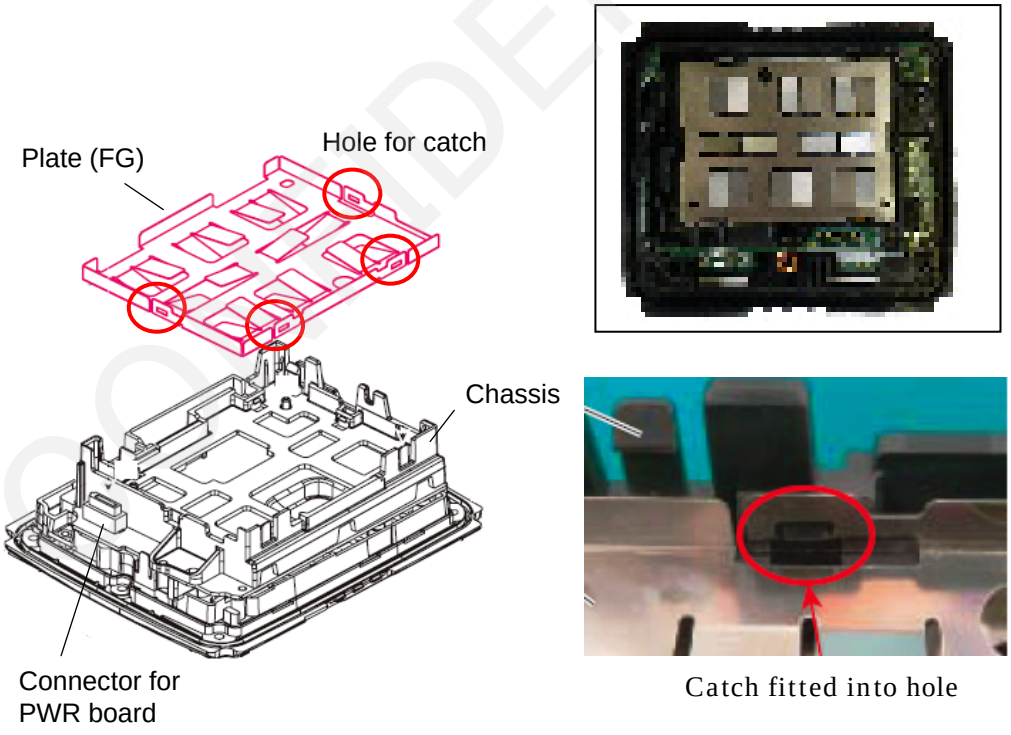

Fig.6.4 Removing Plate (FG)

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4. Loosen seven + pan head P-Tite screws

Note

When assembling, use the positioning projections marked with & in Fig.6.5 and tighten screws #1 to #7 in numerical sequence as shown in Fig.6.5.

5. Remove the Chassis and then the MAIN board/Holder (LCD) assembly.

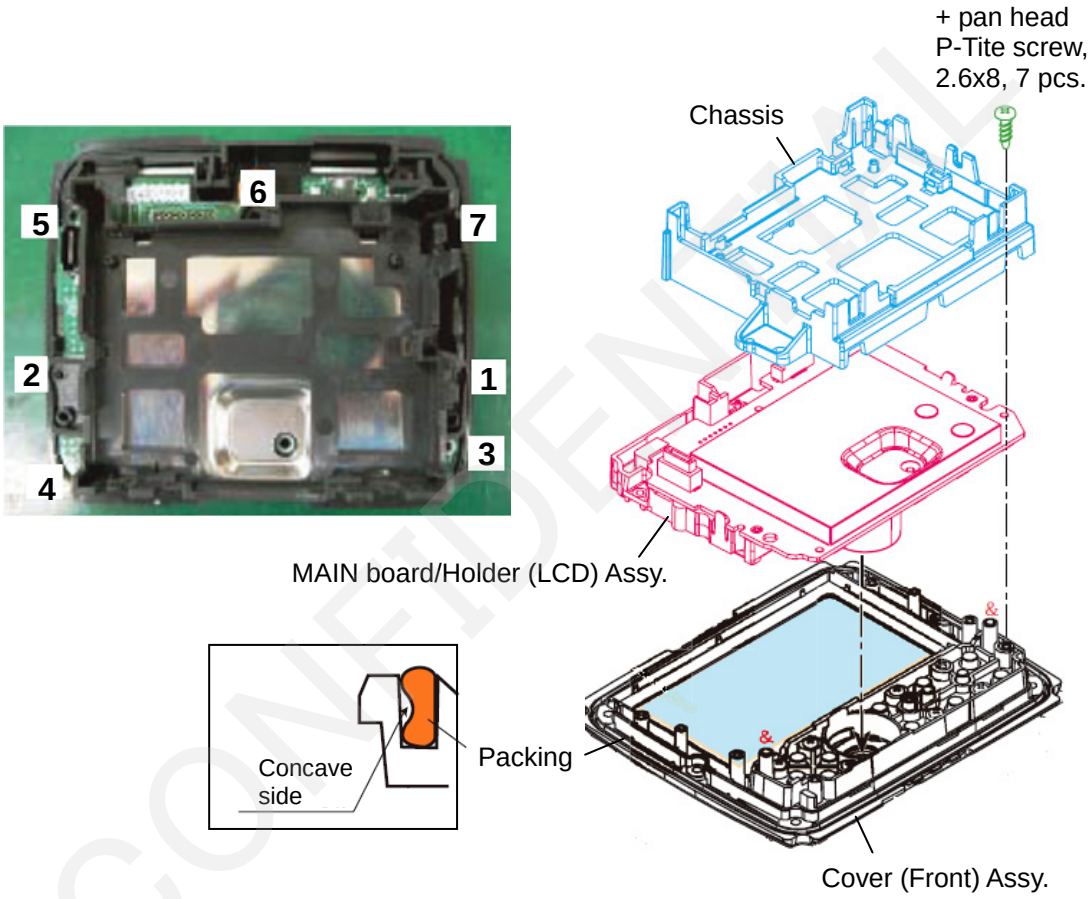

Fig.6.5 Disassembling Cover (Front) assembly

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6. Disassemble the MAIN board/Holder (LCD) assembly by using the following steps.

   1. Disengage the PCB catches both side of the MAIN board.
   2. Lift the near side of the MAIN board and gently pull it out of the grooves. Fig.6.7

      Note that the MAIN board is still connected to the holder (LCD) by the flat cables.

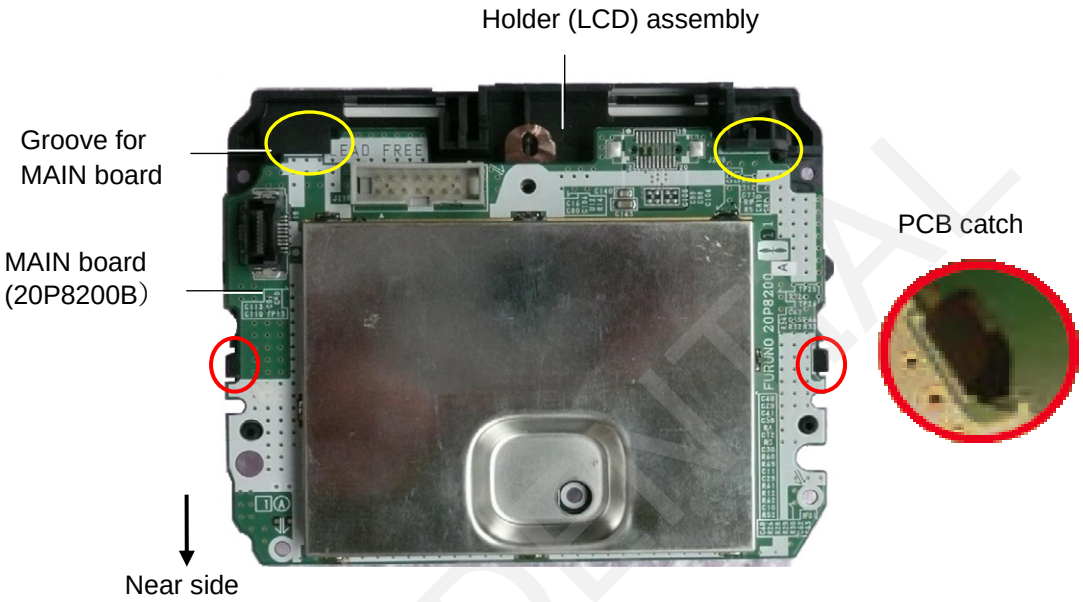

Fig.6.6 MAIN board with holder (LCD)

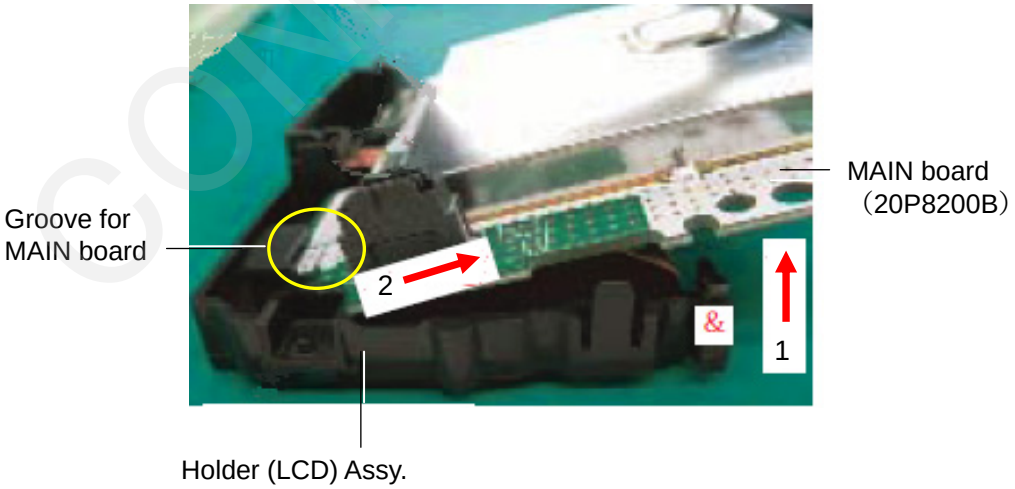

Fig.6.7 Removing MAIN board from grooves

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3. Place the MAIN board with the shield case side down. Fig.6.8.
4. Unplug rotary backlock type FPC connectors, J207 and J208. First, read the precautions for the connector on the next page.

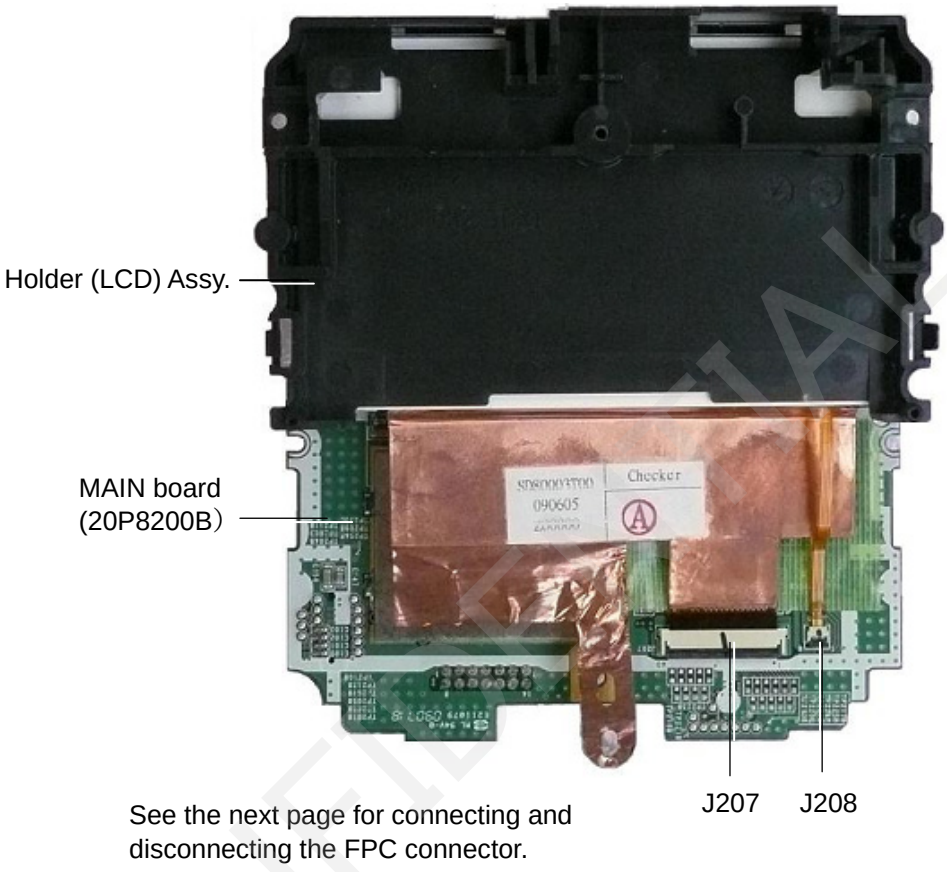

Fig.6.8 Rotary backlock type FPC connectors, J207 and J208

IMPORTANT!
The MAIN board, 20P8200B-55 is used with the PWR board 20P0022A-33 and 0P8200B-22 with 20P0022A-22.

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Flexible Printed Circuit (FPC) Connector

Following describes how to lock and unlock the rotary lock Flexible Printed Circuit (FPC) connector. If the FPC connector is not operated correctly, the damage to the connector and/or FPC and contact failure will result.

CAUTION

a) Do not lock the slider without an FPC inserted.

b) Do not apply pressure horizontally to the board.

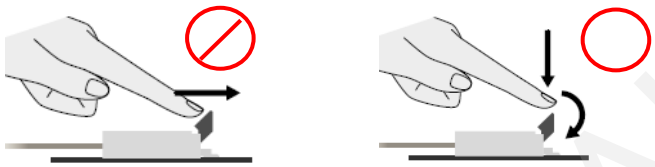


Fig.6.9 Locking rotary lock

Disconnecting cable

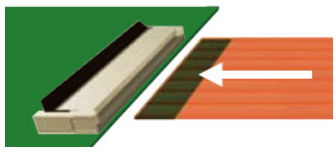
1. Move the slider (lever) upwards to disengage the locking mechanism.
2. Once the lock has been disengaged, pull the FPC out the cable.

Connecting cable

1. Ensure that the slider is unlocked.
2. Insert the FPC right to the back of the connector.
3. Activate the slider and lock the FPC in place.

Step 1 Release rotary lock.

Step 2 Insert FPC.



Step 3 Lock rotary lock.

Fig.6.10 Connecting FPC cable

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6.1.3 PWR board (26P0022A)

To remove the PWR board (26P0022A), first remove the Cover (Rear) assembly by using the procedure below. When only PWR board is removed, it is not necessary to remove the front panel.

1. Set the main alarm panel face down on a soft surface.
2. Remove nuts which hold the connector and washers and nuts on the ground terminal.

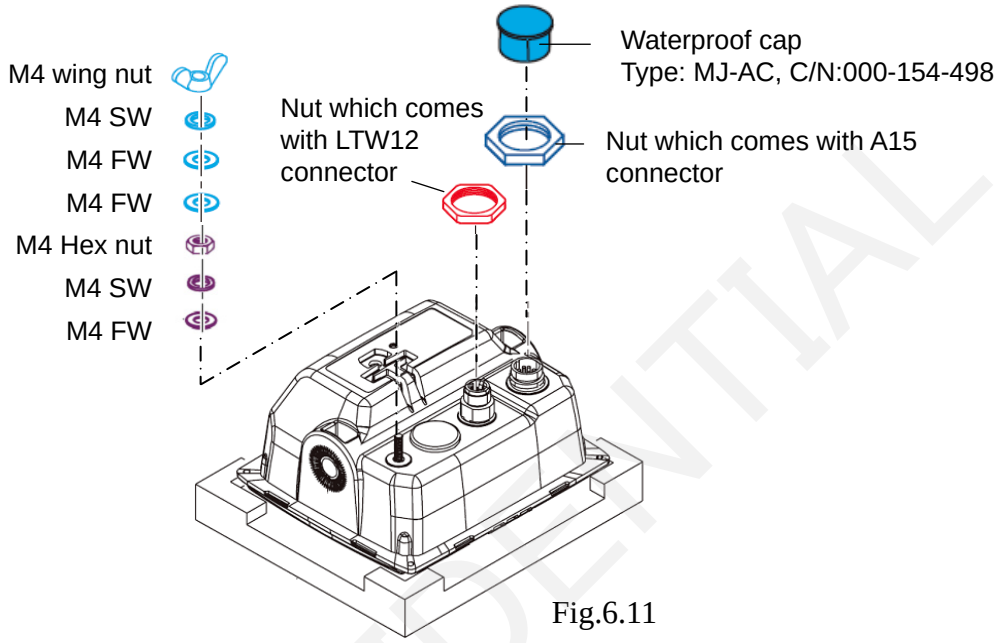
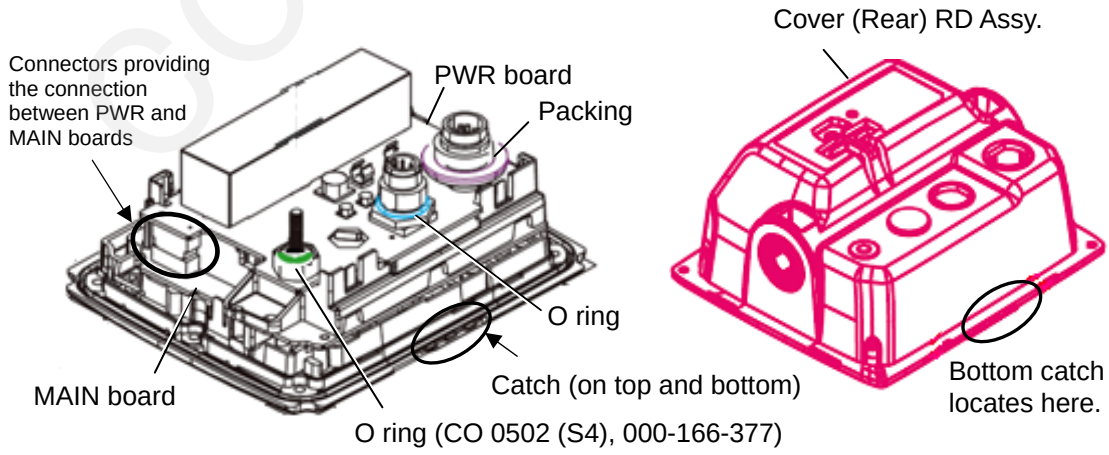


Fig.6.11

3. Prying the two catches (top and bottom) open, remove the Cover (Rear) RD assembly.
4. Unplug the PWR board from the connector on the MAIN board.

Note 1: PWR board of 22 is used with MAIN board of 22 and 33 with 55.



Note 2: Put o-rings aside where they will not be lost.

Fig.6.12 Removing cover (Rear) RD assy.

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6.2 Processor Unit (BR-520)

There are two types of the processor unit: the earlier production has shield cases and the current production does not. Following describes the procedure to disassemble the processor unit of the earlier production.

6.2.1 MAIN board and Power case assembly

To disassemble the processor unit;

1. Remove five type F binding head + Sems M4x10 screws to remove the top cover.

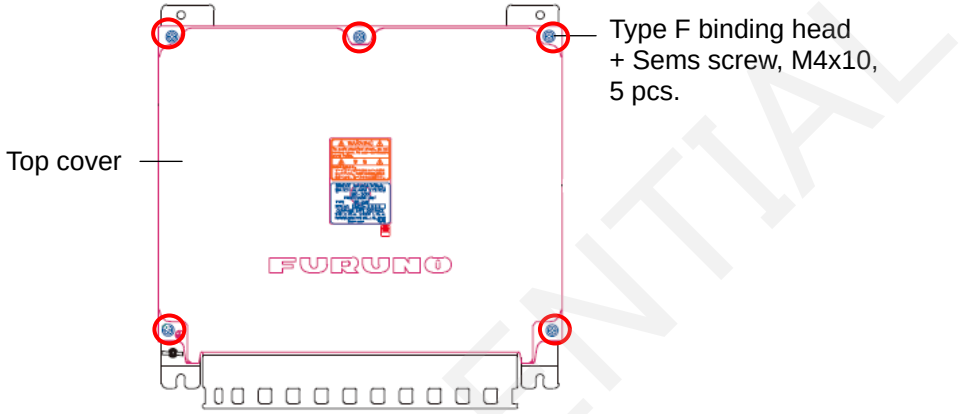

Fig.6.13 Removing top cover

2. Loosen five M4x10 Sems screws and remove the shield case (M1).

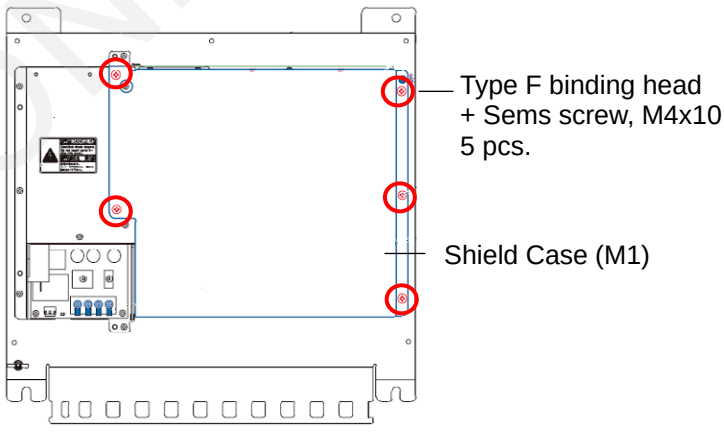

Fig.6.14 Removing Shield case (M1)

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3. Unclamp the cable on the shield case (M2), remove four M4x10 screws, and then detach the shield case (M2).

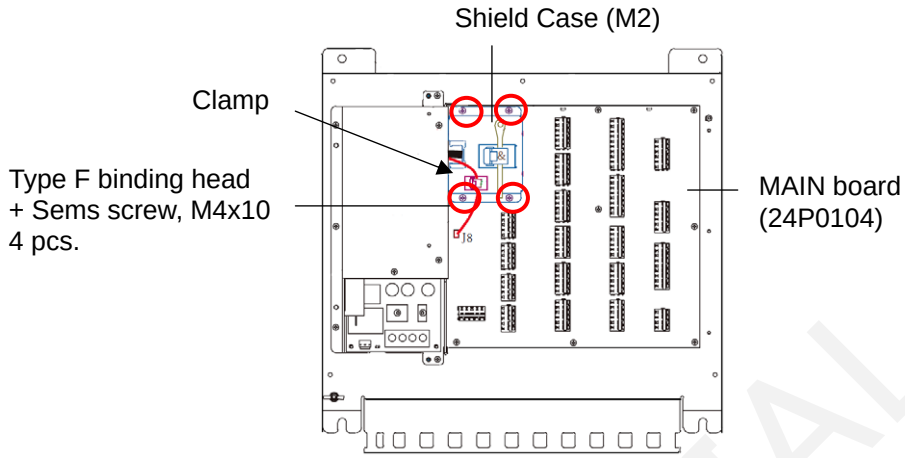

Fig.6.15 Removing Shield Case (M2)

4. To remove MAIN board (24P0104), unplug J4 and J8, and then remove eleven M3x6 screws.
5. To remove the power case assembly which includes PWR board, 24P0105 and Power supply (ZWS100BAF-24/FUR), remove four M3x6 screws.

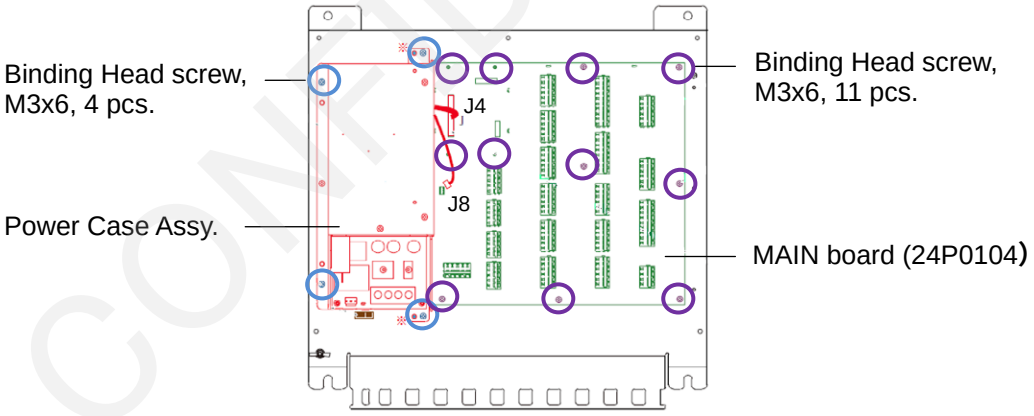

Fig.6.16 Removing MAIN board and Power Case Assy.

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6.2.2 PWR board and Power supply Fan motor

The power case assembly consists of the Power case (Lower) assembly which includes PWR board (24P0105) and fan motor and the Power case (Upper) assembly which includes the power supply (ZWS100BAF-24/FUR).

Use the following steps for disassembling.

1. Loosen four + bind screws marked by * in Fig.6.17 to open the case.
   Note; When assembling, use locating holes marked by &. See Fig.6.17.
2. Unplug J2 on the PWR board (24P0104) and separate the power case (Upper) assembly from the power case (Lower) assembly.

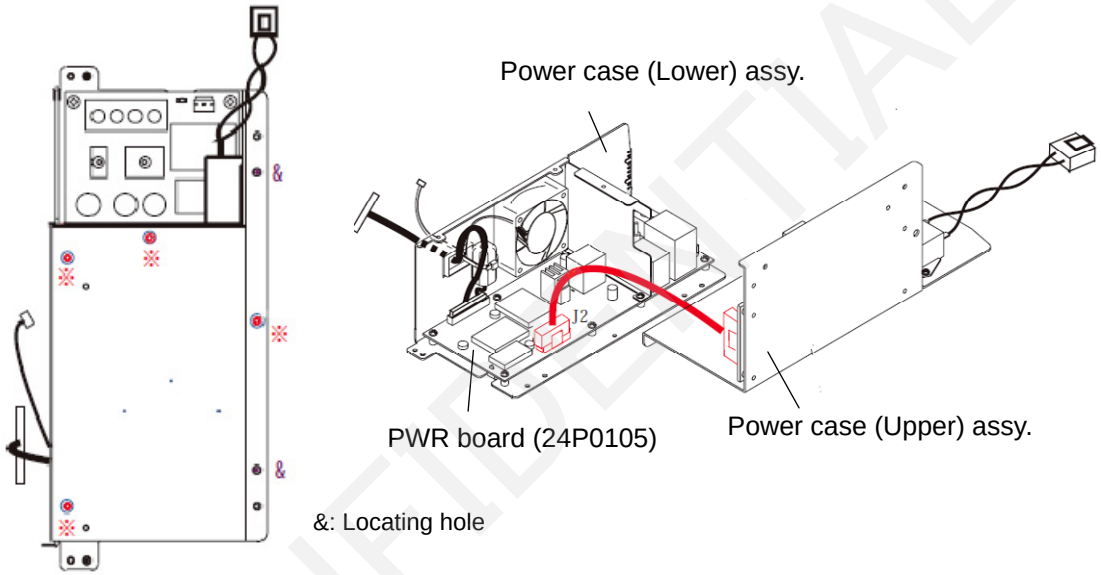

Fig.6.17 Disassembling power case assembly

To remove PWR board (24P0104);

1. Remove two M3x6 screws which fix the PWR shield plate. See Fig.6.18.
2. Remove six M3x6 screws which fix the PWR board to the chassis.

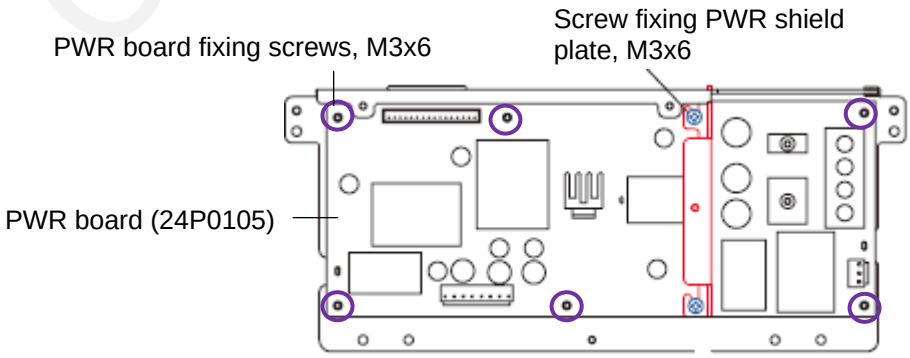

Fig.6.18 Removing PWR board (24P0105)

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To remove Power Supply (AC/DC converter);

The power supply, or AC/DC converter is removed from the power case (Upper) by using the steps below.

1. Remove four M3 x 6 screws to remove the Power supply (ZWS100BAF-24/FUR).

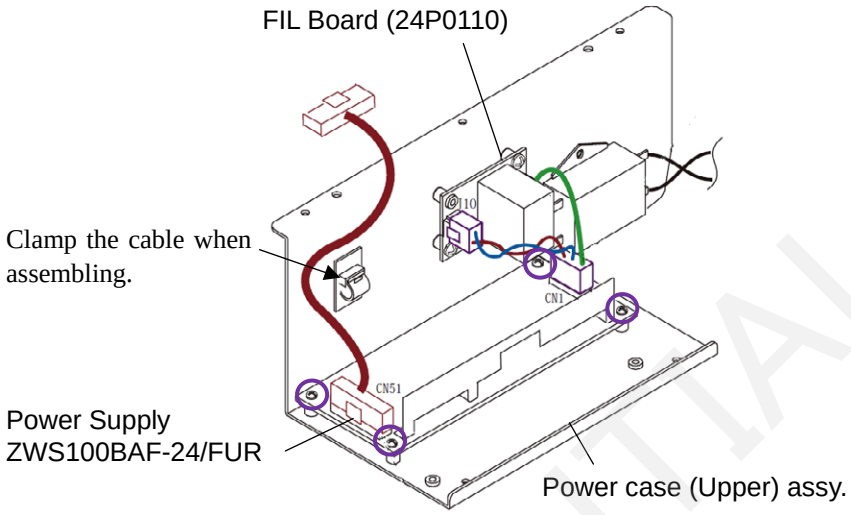

Fig.6.19 Removing Power supply

6.2.3 Fan motor

The life time of the fan motor on the power case (Lower) assembly varies according to the ambient temperature, but it is about five years typically. To remove the fan motor, remove two M3x30 screws. The label sticker on the fan motor is facing inward.

Use dowels on the chassis to align the fan motor so that the mounting holes not in use on the fan are over the dowels.

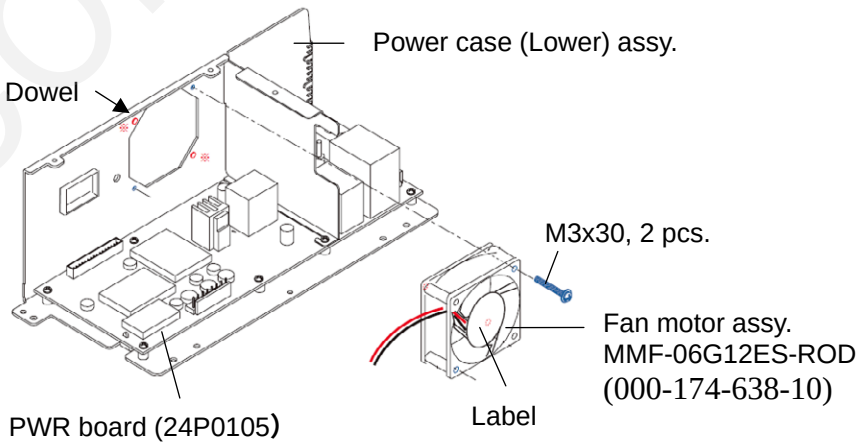

Fig.6.20 Removing fan motor

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6.3 Timer Reset Panel (BR-530)

The timer reset panel includes the CNT board (24P0106) and a push button, AR22EOR-10BZ1.

1. To remove the CNT board and push button, first, remove the cover assembly by loosening four M3x10 Sems screws. See Fig.6.21.

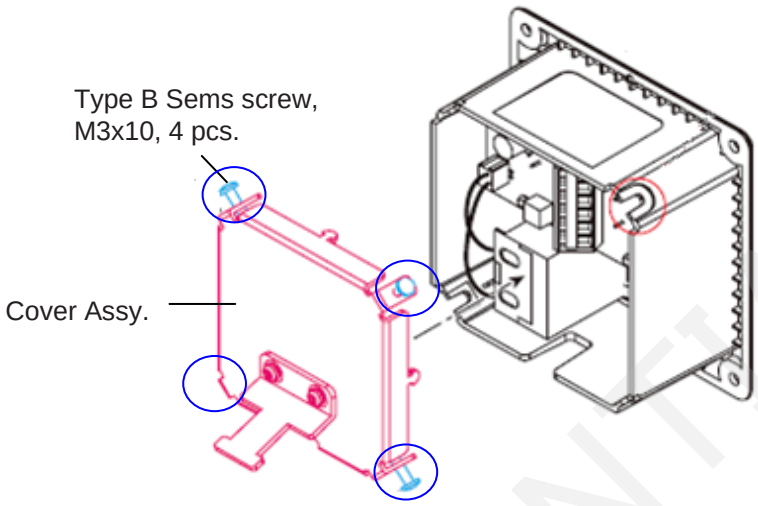

Fig.6.21 Removing Cover assembly from BR-530

Push button (AR22EOR-10BZ1)

The button consists of an operator and a contact block. To detach the contact block from the operator, pull-out the contact block in the direction by the arrow in Fig.6.22 while keeping the white release arm pressed with one finger.

Mounting operator to panel

As shown in Fig.6.22, align the release arm with the operator groove at the arrow mark. Then, insert the contact block into the operator until it clicks.

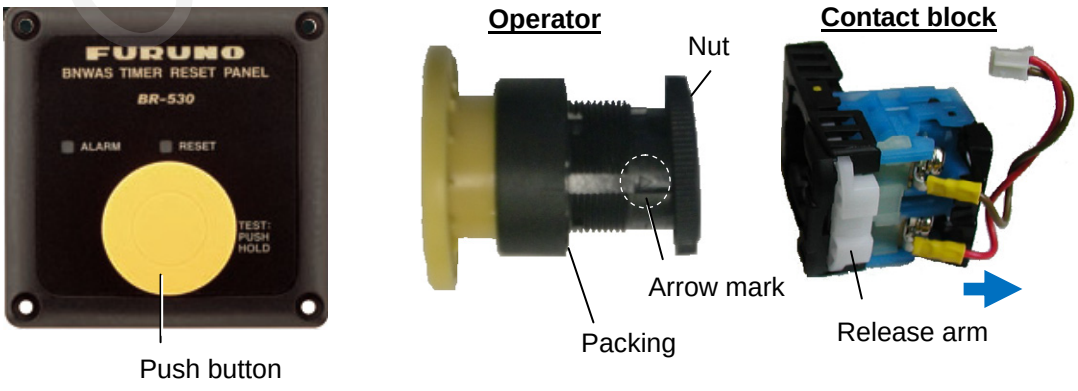

Fig.6.22 Push button, AR22EOR-10BZ1

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2. Unplug J1, remove four + pan head P-Tite screw, 2.6x8, and then remove the CNT board (24P0106).
3. Detach the contact block from the operator, unscrew the nut, and remove the operator of the push button.

Note: When assembling, insert the operator of the push button with the arrow mark outward. The operator should have the packing. The convex on the operator nut is facing you.

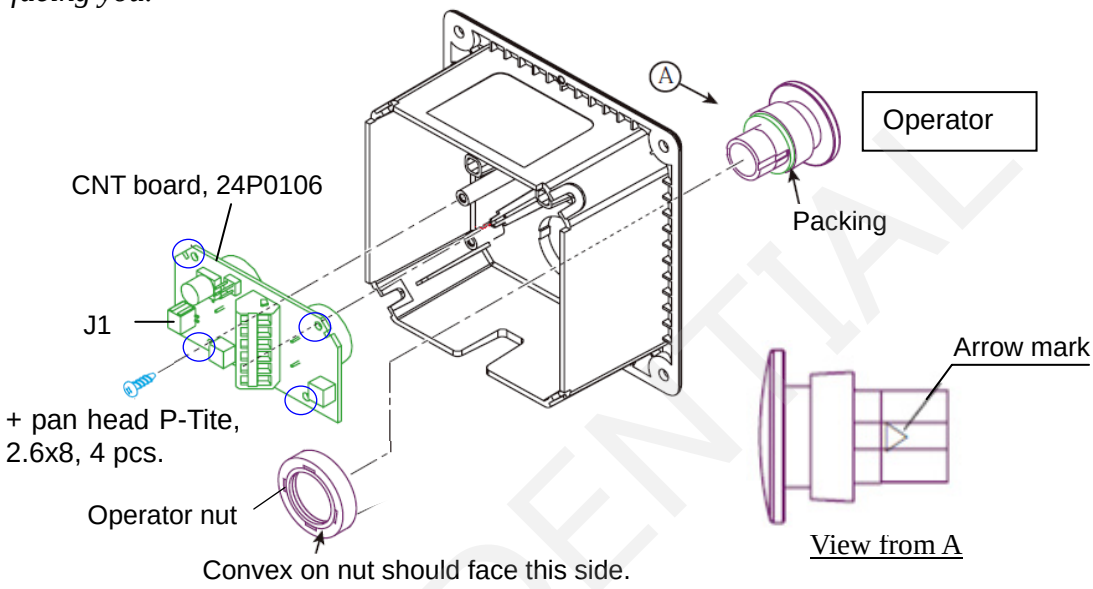

Fig.6.23 Mounting CNT board and Operator of push button

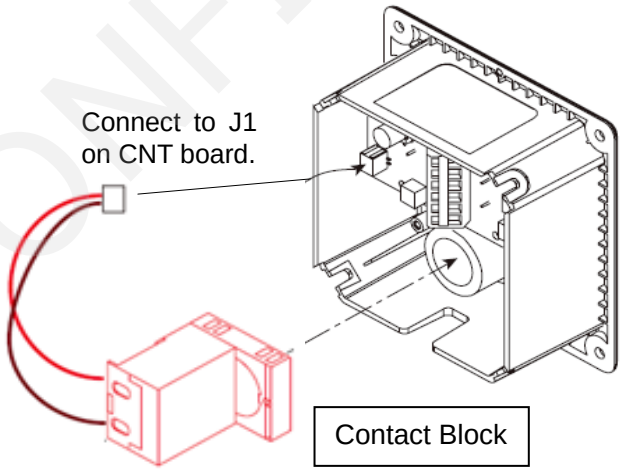

Fig.6.24 Mounting Contact Block of push button

6.4 Cabin Panel (BR-540)

To remove the CNT board, 24P0106A in the cabin panel, BR-540, refer to “Timer Reset Panel”, previous section.

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6.5 Motion Detector (BR-560)

The MOT board, 24P0107 is fixed in the Motion detector (BR-560) with four + pan head P-Tite 2.6x8 screws. See Fig.6.25.

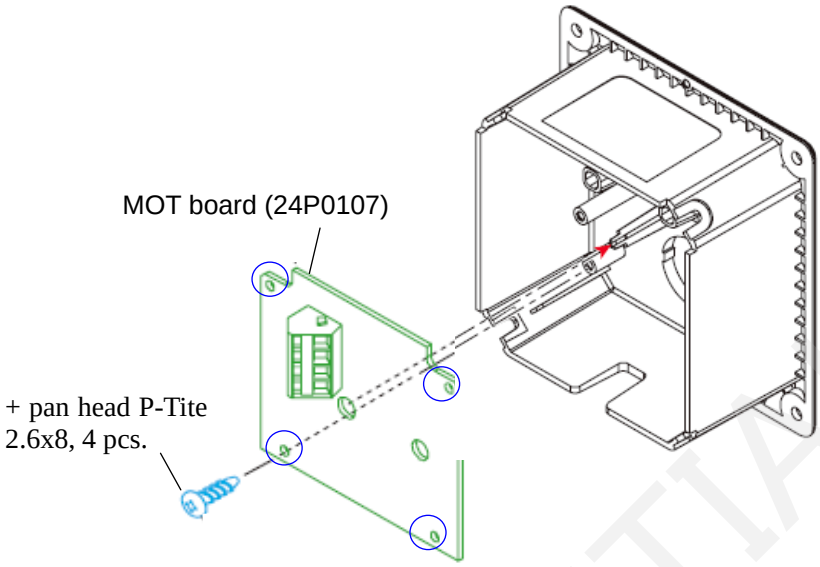

Fig.6.25 Fixing MOT board in Motion Detector panel

6.6 Flash Beacon (BR-570)

The LED light is fixed onto the flash beacon panel as shown in Fig.6.26.

Note: Two packings are used.

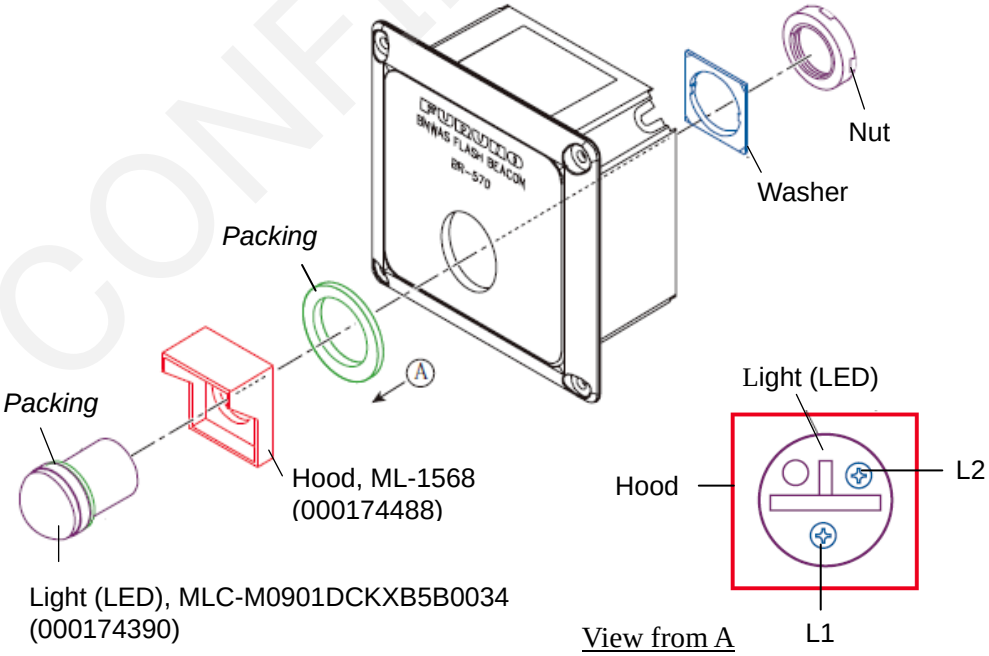

Fig.6.26 Fixing Light onto Flash Beacon panel

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Chapter 7 Troubleshooting

This chapter describes self test and connection check procedures.

7.1 Self-diagnosis

The system provides two test capabilities: Self test and LCD test. The self test checks the operating status of the RAM/ROM and keyboard while the LCD test the LCD monitor. The self test is carried out through the Administrator and Service menus and the LCD test through the Service menu.

To terminate the test, press MENU key three times.

Figs.7.1 and 7.2 show the menus used for self test.

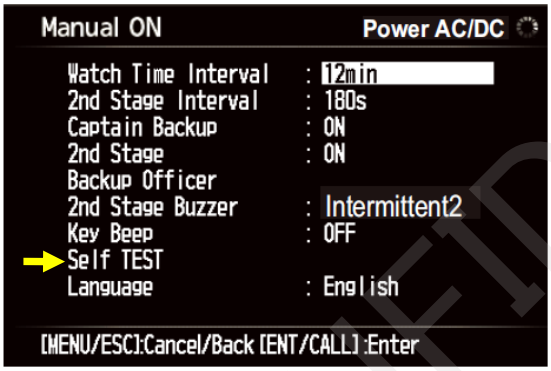

Fig.7.1 Administrator menu

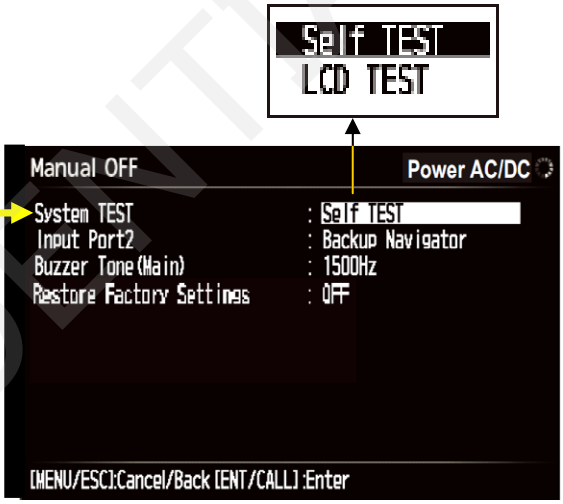

Fig.7.2 Service menu

7.1.1 Self Test

The self test is carried out through the Administrator and Service menu.

When using Administrator menu;

1. Open the Administrator menu with the password.
2. Select the Self TEST and press ENT/CALL key.
3. The self test result like Fig.7.3 is displayed.
4. Press the key for test. If the key works normally, the color changes to red in the display. The color is back to black when the key is pressed again.
5. Press MENU/ESC key three times to terminate the test.

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When using Service menu;

1. Open the Service menu with the password.
2. Select the System TEST and press ENT/CALL key.
3. Select the Self test and press ENT/CALL key.
4. For keyboard test, press a key so that the corresponding key in the display becomes red.

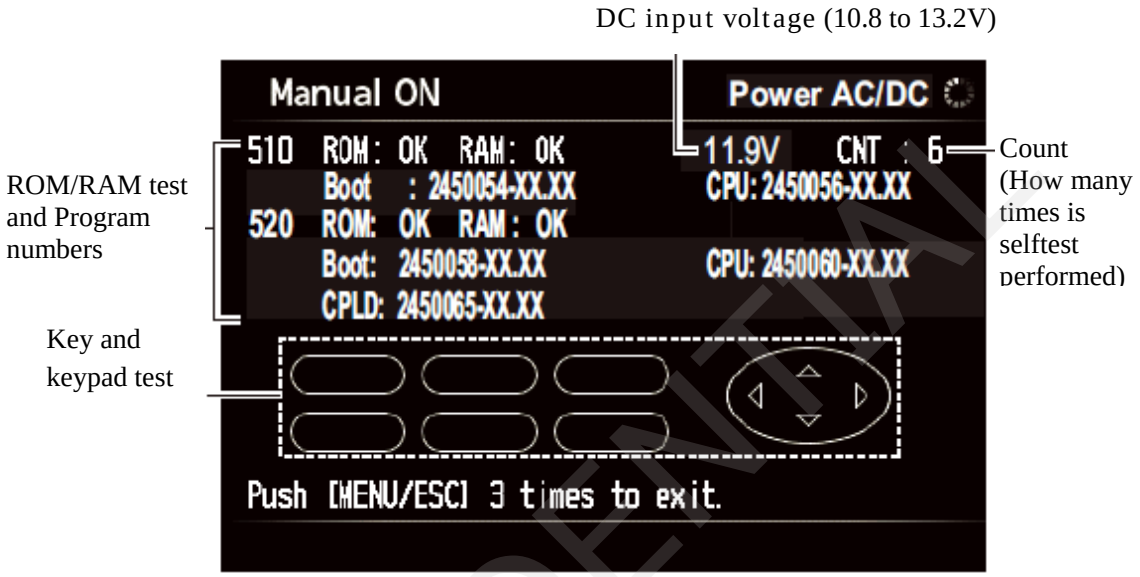

Fig.7.3 BR-500 Self Test display

7.1.2 LCD Test

The LCD test is for colors and pixels. To test the LCD, use the steps below.

1. Open the Service menu with the password.
2. Select the System test and press ENT/CALL key.
3. Select the LCD TEST and press ENT/CALL key. The display becomes uniformly red.
4. Press the ENT/CALL key again, and the display changes to green.

   Pressing the ENT/CALL key repeatedly will sequence through the displays in following colors, and go back to the first display again.

   Red > Green > Blue > Gradation red > Gradation green > Gradation blue > White > Black > Gradation black > Red
5. Press MENU/ESC key three times to terminate the test.

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7.2 Checking Connections

The system provides the function to check the connection of the unit to the processor unit.

7.2.1 Main Alarm Panel (BR-510)

The main alarm panel, BR-510 is connected to the processor unit, BR-520 via NMEA2000 capable of detecting an error. If the BR-510 does not receive the ACK signal from the BR-520 after sending the signal, an Acknowledgement Error occurs and "Failure: Communication" message is generated in red.

7.2.2 Timer Reset Panel and Cabin Panel (BR-530/540)

These units output a test signal to the processor unit when the following operation is made.

a) On Timer Reset Panel (BR-530/550), long press RESET button.

b) On Cabin Panel (BR-540), press TEST button.

Receiving the test signal, the processor unit generates the ACK signal for five seconds and sends it to the panel.

Table 7.1 ACK signal being generated by Processor Unit

TB in BR-520	TB-3 to TB-6		TB-7 to TB-15		
ACK Signal	H/L	H/L	H	H	H/L
Output from	RST LED	RST BUZ	DUTY	ALM	BUZ
Output to	BR-530/550		BR-540		

If the panel is connected to the processor unit normally, the LED and buzzer activate for five seconds as shown in Table 7.2 when the test signal is received.

Table 7.2 Status after pressing TEST button

Unit	BR-530/550		BR-540		
Visual/Audio alarms	Alarm LED	Buzzer	DUTY LED	ALARM LED	Buzzer
Status	Blinks	Sounds	Lights	Lights	Sounds

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7.3 Checking Power Supply

The power supply circuit in the processor unit generates AC and DC power failure signals: AC POWER FAIL and DC POWER FAIL when power is not supplied. These signals are output from pins #15 and #16 of J3 on the PWR board, 24P0105 to pins #15 and # 16 of J4 on the MAIN board, 24P0104 respectively. When the MAIN board receives the signal, it generates the red error message, "Failure: AC (or DC)".

The power indicator appears at the upper right of the display on the main alarm panel. When the system is powered by both AC and DC power supplies, the power indicator reads "Power AC/DC". When only AC power is present, the indication is "Power AC".

Power indicators

1) Power AC/DC: Powered from both AC and DC power supplies.
2) Power AC: Powered from AC power supply.
3) Power DC: Powered from DC power supply.
4) Power --/--: No data (The main alarm panel fails communication with the processor unit.)

Fig.7.4 Power indicator in the top line of display

Incorrect power error message

If the indication is "Failure: DC (AC)" when AC (DC) power is removed, check the connection between the PWR and MAIN boards. Probably, the AC/DC POWER FAIL lines are connected reversely. J3 on the PWR board and J4 on the MAIN board are connected with straight-through cables. The pins #15 and #16 on these connectors are AC POWER FAIL and DC POWER FAIL lines respectively. If the lines are crossed over, the incorrect error message is generated.

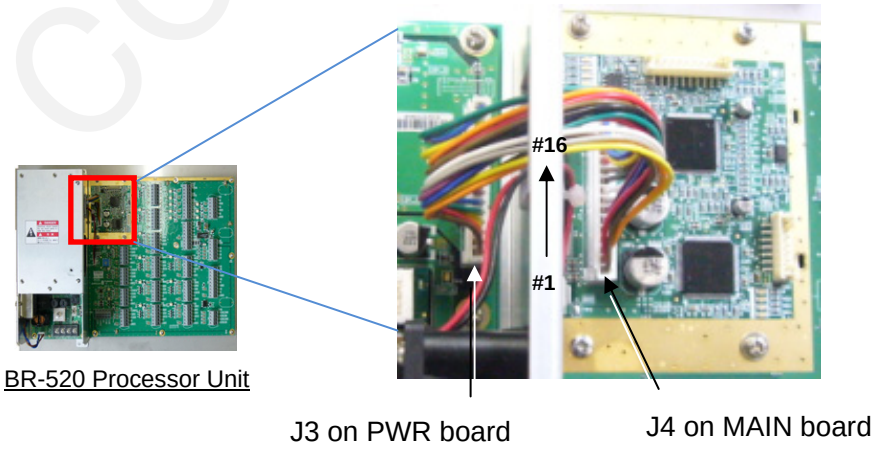

Fig.7.5 Connections between PWR and MAIN boards

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7.4 FAQs

The following frequently asked questions (FAQs) are some of the most common that we receive.

Q1: How to adjust the buzzer sound pressure level?

A1: The sound level cannot be adjusted. The IEC62616 provides that the first stage bridge audible alarm sound pressure level 1 m from the source shall be at least 75 dB but not greater than 85 dB and the second and third stage remote audible alarm sound pressure level 1 m from the source shall be at least 75 dB but not greater than 120 dB.

The BR-500 generates the audible alarm with the sound pressure level of 75 dB to 85 dB. The level varies slightly according to the buzzer tone.

Q2: How to adjust the buzzer tone?

A2: On the Main alarm panel, the buzzer tone is adjusted through the service man menu (Default frequency: 1500 Hz). On the Cabin panel, the buzzer tone is adjusted by the rotary switch S2 in the BR-520 (Default frequency: 4.2 kHz).

Q3: What is operator fitness signal?

A3: The equipment on the bridge outputs a signal every time when the bridge operator makes any operation. This signal is called “Operator fitness” signal and generally a contact closure signal. FEA-2x07 series ECDIS and FAR-2xx7 series radar outputs this signal.

Q4: What is backup navigator signal?

A4: The track control system generates a backup navigator alarm if the actual course change alarm is not confirmed by the officer of the watch within 30 seconds of wheel-over. The track control system outputs this signal. Receiving the backup navigator (alarm) signal, the BNWAS activates an emergency call.

Q5: How to connect FAR-2xx7 radar to BR-500?

A5: Pins #7 and #8 of J612 in FAR-2xx7 are connected to the INPUT port of BR-500. In the Alarm menu of radar, the ALARM OUT4 is set to Operator Fitness.

Q6: How to connect the autopilot and ECDIS/TCS to BR-500?

A6: The autopilot mode signal is connected to INPUT1 port on BR-500. The ECDIS/TCS outputs the operator fitness and backup navigator alarm signals. The operator fitness signal is connected to the INPUT port except for INPUT1.The backup navigator alarm signal is connected to the INPUT2 port and the function of INPUT2 port is changed through the service menu accordingly.

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Q7: Can FR-2165DS be connected to the BNWAS?
A7: No, FR-21x5 and FR-28x5 series radar does not output the operator fitness signal. Only FAR-2xx7 series radar outputs the operator fitness signal.

Q8: When the BNWAS is installed on board an existing ship, is it necessary to connect to the VDR and the autopilot?
A8: The NK does not define these connections, but it is recommended to connect them as below.

Autopilot: Connect the autopilot to the BNWAS. If the autopilot does not output the contact closure mode signal, consult the ship classification societies.

VDR: Connect the VDR to the BNWAS if possible. Both ALR sentence and System Failure signal are connected.

Q9: Can the timer reset panel be installed outside the bridge?
A9: No, it must be installed in the bridge according to MSC128 (75).

Q10: Which terminal board is used for the cabin panel in Captain and Backup officers?
A10: The captain is always connected to TB7. It is recommended that the chief officer, second officer, and third officer are connected to TB8 to TB10 respectively so that it is not necessary to change the officer name through menu.

Q11: How to connect an external alarm.
A11: A buzzer or LED is connected via a relay circuit as shown in Fig.7.6. The resister in the relay circuit is selected so that the output current from the BR-520 is 10 mA or less.

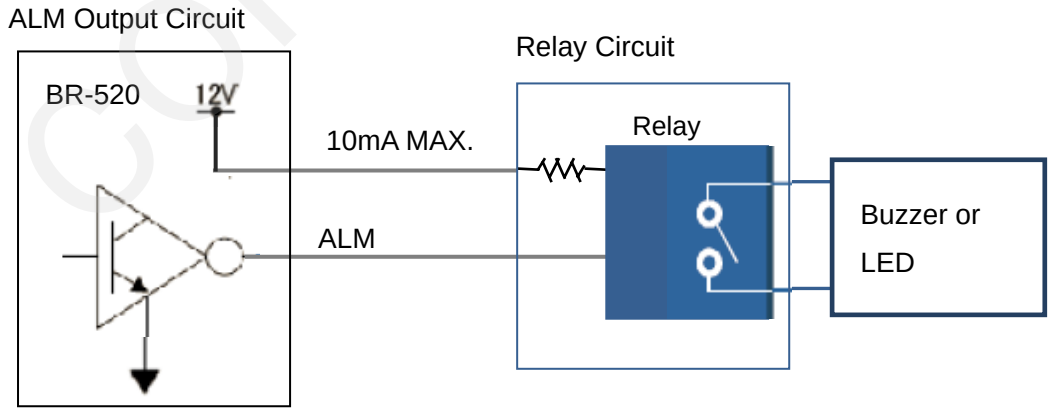

Fig.7.6 Connecting external buzzer

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Q12: Which stage of the alarm should trigger the cabin panel in crew and public areas?

A12: The NK defines that the third stage alarm triggers the cabin panel in crew and public areas. Other classification societies do not define about this matter.

In BR-520 MAIN program, 2450060-01.05 and earlier, the cabin panel in crew and public areas, or connected to TB13, TB14, and TB15 receives the alarm from the second stage. If the second stage alarm is not required, update the BR-520 MAIN program to V01.06 and later. In these program, #7 of S1 on the MAIN board in the processor unit chooses the alarm output from TB13, TB14, and TB15: the second stage or the third stage alarm.

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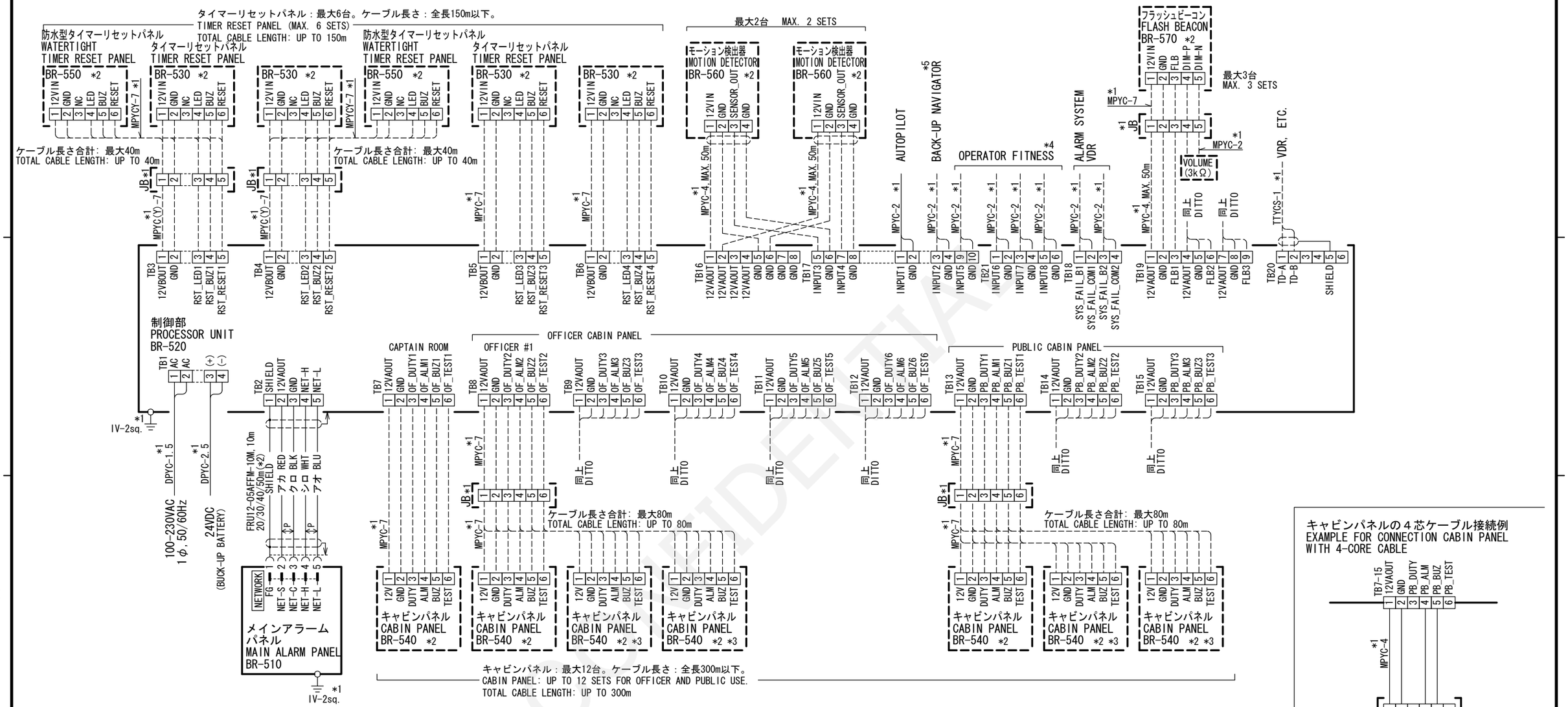
S-1



注記
＊１）造船所手配。
＊２）オプション。
＊３）キャビンパネルは最大３台まで接続可能。
＊４）モーション検出器に変更可能。
＊５）モーション検出器・オペレータフィットネスに変更可能。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: MAX. 3 CABIN PANELS CAN BE INSTALLED.
*4: CONNECTION CAN BE CHANGED TO MOTION DETECTOR.
*5: CONNECTION CAN BE CHANGED TO MOTION DETECTOR OR OPERATOR FITNESS.

DRAWN 19/Aug/2011 T.YAMASAKI			TITLE BR-500
CHECKED 19/Aug/2011 H.MAKI			名称 船橋航海当直警報装置
APPROVED 19/Aug/2011 Y.NISHIYAMA			相互結線図
SCALE	MASS kg		NAME BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM
DWG No. C4461-C01- N		REF. No. 24-012-6001-2	INTERCONNECTION DIAGRAM

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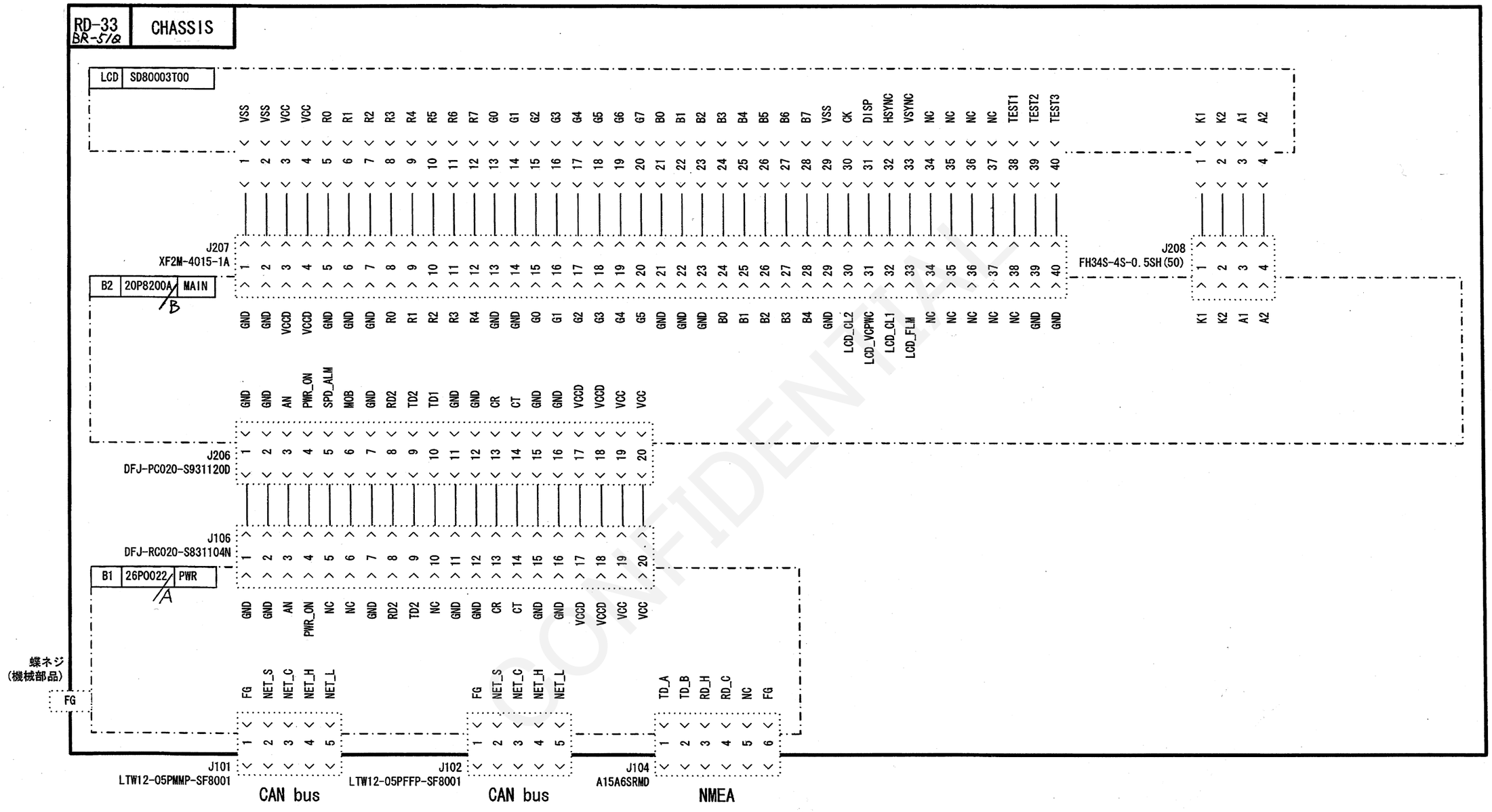

MODEL 機種	20P8200	26P0022	J102
BR-500	B	A	NOT MOUNTED
RD-33	A		MOUNTED

DRAWN 10. Jan. 2012 T. TAKENO			TYPE BR-510
CHECKED 10. Jan. 2012 T. Asami			名称 メインアラームパネル
APPROVED 11 Jan. 2012 Y. Honda		BR-500	回路図
SCALE	MASS	MODEL BLOCK No.	NAME MAIN ALARM PANEL
Dwg No. C4461-K01-A		REF. No. 26-002-5000-1	SCHEMATIC DIAGRAM

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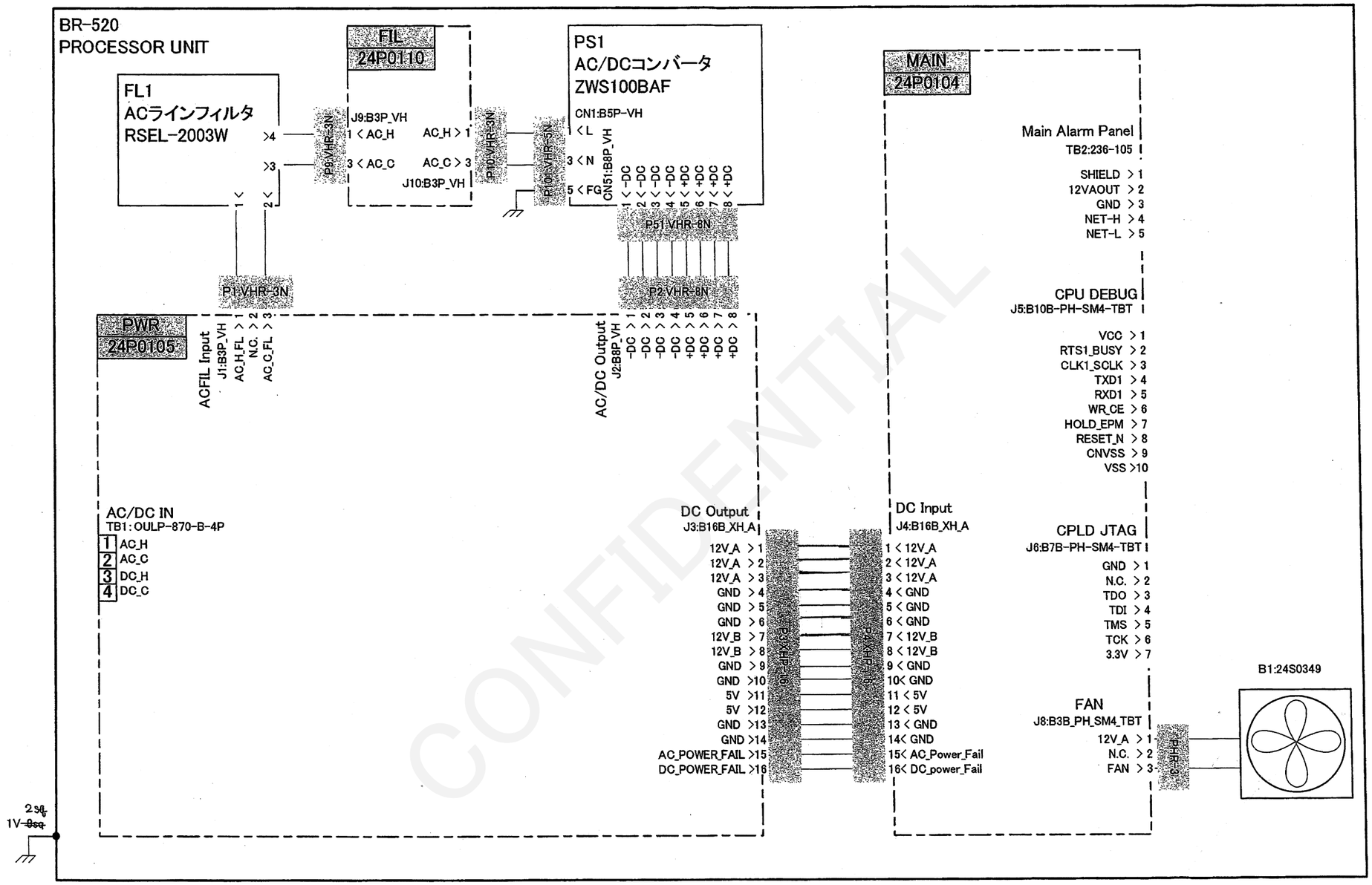

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DRAWN 10. Jan. 2012 T. TAKENO		TYPE	BR-520
CHECKED 10. Jan. 2012 T. Asami		名称	プロセッサーユニット
APPROVED 11. Jan. 2012 Y. Honda	BR-500		回路図
SCALE / MASS	MODEL / BLOCK No.	NAME	PROCESSOR UNIT
Dwg No. C4461-K02-A	REF. No. 24-012-6012-2		SCHEMATIC DIAGRAM

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